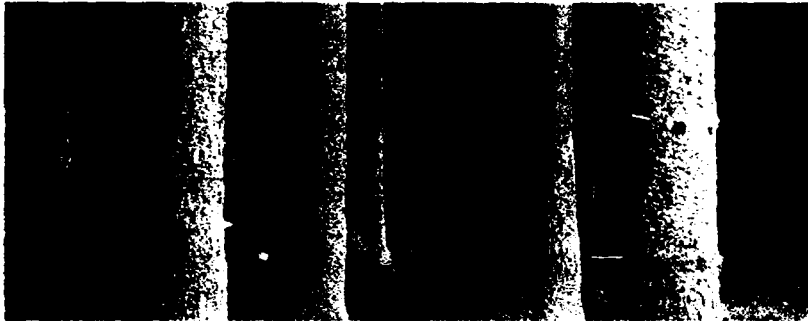


Report



Phase II Removal Action Work Plan

Riverdale
Chemical
Company

July 2001

Prepared For



Prepared By





*Integrated
Environmental
Solutions*

222 South Riverside Plaza
Suite 820
Chicago, IL 60606
Telephone: 312-575-0200
Fax: 312-575-0300

July 30, 2001

Ms. Callie Bolattino
On Scene Coordinator
United States Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Subject: Riverdale Chemical Site, 05K2
Chicago Heights, IL

Dear Callie:

RMT Inc. (RMT), on behalf of Riverdale Chemical Company (Riverdale), is submitting the approved Final Phase II Removal Action Workplan (Workplan). At your suggestion, we are submitting the updated pages only (Final versus Draft). We are providing the appropriate pages to the Work Plan and the Construction Quality Assurance Plan (CQAP).

Thank you for your expedient review and approval of the Work Plan. As always, we appreciate your cooperation. Please contact me at 312-575-0200 with questions or comments.

Sincerely,

RMT, Inc.

A handwritten signature in black ink, appearing to read 'Rae'.

Rae Mindock
Senior Project Manager

cc: Ms. Karen Peaceman/USEPA
Dr. Peter Bibby/Riverdale
Mr. Todd Wiener/MWE



*Integrated
Environmental
Solutions*

222 South Riverside Plaza
Suite 820
Chicago, IL 60606
Telephone: 312-575-0200
Fax: 312-575-0300

PHASE II REMOVAL ACTION WORKPLAN

RIVERDALE CHEMICAL COMPANY

Prepared For
Riverdale Chemical Company
Chicago Heights, Illinois

Prepared By
RMT, Inc.
Chicago, Illinois

July 2001

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List of Acronyms

ASTM	American Society for Testing and Materials
bgs	below ground surface
CQAP	Construction Quality Assurance Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
CFR	Code of Federal Regulations
DQO	Data Quality Objective
HSC	Health and Safety Coordinator
HSP	Health and Safety Plan
HSR	Health and Safety Representative
IAC	Illinois Administrative Code
ID	internal diameter
IDW	Investigation-derived waste
IEPA	Illinois Environmental Protection Agency
O&M	Operation and Maintenance
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
ppb	parts per billion
PPE	personal protective equipment
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SOP	standard operating procedure
SOW	Statement Of Work
SW846	Test Methods for Evaluating Solid Waste 1986
TCLP	Toxicity Characteristic Leaching Procedure
USDOT	United States Department of Transportation
U.S. EPA	United States Environmental Protection Agency

Section 1

Introduction

This Phase II Removal Action (Phase II RA) Workplan (the Workplan) was prepared on behalf of Riverdale Chemical Company (Riverdale), to serve as the basis for the overall management of the Phase II RA to be implemented at the Riverdale Site.

The scope of the Phase II RA includes the installation of an asphalt engineered barrier. The components of this Phase II RA Workplan include the following:

- Installation of asphalt engineered barrier.
- Installation of stormwater collection system.
- Establishment of institutional controls in the form of deed restrictions.
- Description of the overall management strategy for performing the installation including reporting of results and conclusions for USEPA review and approval.
- Documentation of the qualifications, responsibility, and authority of all organizations involved with the implementation of the Phase II RA.

This Workplan describes the methods to be used to complete each of the components of the Phase II RA. The Workplan document provides the objectives and the technical approach for completing all the tasks outlined above.

The Workplan has been organized into the following seven sections:

- Section 1 Introduction - provides the basis, approach, and organization of the Workplan
- Section 2 Project Background - summarizes the information presented in the previous studies conducted at the Site
- Section 3 Removal Activities - presents the scope of work and technical approach for completing the Phase II RA
- Section 4 Project Organization and Management - introduces the overall organizational structure, project management, and the technical background of key personnel involved in completing the Phase II RA
- Section 5 Progress Reports
- Section 6 Project Schedule - presents the estimated schedule for completing Phase II RA project tasks
- Section 7 References - presents document references used to prepare this document (including appendices). It also includes the USEPA Administrative Orders issued for the site.

The design of the asphalt engineered barrier was completed by Joseph A. Schudt & Associates for Riverdale Chemical Company. The Site Improvement Plans, including Site Specifications, Site Calculations and design drawings are provided in Appendix A.

The Construction Quality Assurance Plan (CQAP) is included as Appendix B. The CQAP establishes quality control procedures that ensure the precision and accuracy of all data gathered related to the Phase II RA.

The Health and Safety Plan (HSP) prepared during the Phase I has been designed to protect on-site personnel from potential hazards associated with the site activities. The plan was approved by the USEPA during the Phase I RA activities. The Phase II RA activities will be completed at areas, which based on existing data, do not contain soils which pose an excess cancer risk greater than 1×10^{-4} or an hazard index greater than 1 for construction workers. Activities that will be conducted at areas, which may potentially expose workers to impacted soil, will be conducted under the HSP as described in Section 3, Removal Activities. The HSP prepared during the Phase I RA is included in the Workplan as Appendix C.

Section 2

Project Background

The Riverdale Chemical Company in Chicago Heights, Illinois, is an active facility used for the formulation and packaging of various agricultural and turf chemicals. The Phase I Removal Action Report, dated February 2001, provides information on the project background. This Phase II RA Workplan describes the installation of the asphalt engineered barrier and the associated storm water collection system.

Section 3

Removal Activities

3.1 Description of Phase II Removal Action

The Phase II removal action includes the installation of an engineered asphalt cap and associated storm water collection system. Principal aspects and objectives for the Phase II RA were determined based on discussions between Riverdale and USEPA.

The removal action components of this Phase II RA Workplan include the following:

- Subgrade preparation of the site.
- Placement of crushed aggregate base course.
- Placement of bituminous asphalt course.
- Installation of new storm water retention basin in the northwest portion of the site with tie-in to city storm sewer.
- Installation of a retention pond in the southeast portion of the site and tie in to city storm sewer.
- Pavement and base course testing will be conducted according to the American Society for Testing and Materials (ASTM) and/or American Association of State Highways and Transportation Officials (AASHTO) standards.
- Description of the overall management strategy for performing the installation including, reporting of results and conclusions for USEPA review and approval.
- Documentation of the qualifications, responsibility, and authority of all organizations involved with the implementation of the Phase II RA.

The scope of activities are described in the Specifications and Construction Quality Assurance Plan, included as appendices to this Phase II RA Workplan. There is not anticipated to be any sampling or excavation and off-site disposal of soil during the Phase II RA.

Phase II RA activities will be conducted to be consistent with current OSHA regulations and protocols which have been designated to protect on-site personnel from potential hazards associated with site activities as described in the HSP. The activities to be conducted under the HSP include any intrusive activities such as scarification and excavation south of the site buildings. The USEPA has determined that activities associated with installation of the retention basin in the low lying area do not have to be conducted under the HSP.

3.2 Sampling and Testing

The sampling and testing that will occur during the Phase II RA is described in the CQA Plan provided as Appendix B. The testing program is briefly described below.

3.2.1 Scope

The scope of work for the sampling and testing includes:

- Testing of bituminous materials prior to placement and after placement and curing by the paving contractor.

Material testing will be performed according to ASTM and AASHTO testing standards.

3.2.2 Analytes and Sampling and Testing Frequency

Pavement testing will be performed in accordance with ASTM and AASHTO testing methods for asphalt pavements. Table 3-1, Standard Testing Methods, lists the methods to be followed for testing of asphalt engineered barrier.

3.3 Removal Action

The Phase II removal action includes the installation of an engineered asphalt cap and associated storm water collection system. The Phase II RA Plan is shown in Figure 3-1, with pavement details shown in Figure 3-2. The scope of the removal action includes:

- Subgrade preparation of the site.
- Placement of crushed aggregate base course.
- Placement of bituminous asphalt course.
- Installation of new storm water retention basin in the northwest portion of the site with tie-in to city storm sewer.
- Installation of a retention pond in the southeast portion of the site with tie-in to city storm sewer. The eastern portion of the site will be seeded after installation of storm sewer.
- Pavement and base course testing will be conducted according to the ASTM and AASHTO standards.

Following completion of the Phase II RA activities, institutional controls in the form of deed restrictions will be placed on the property. The intention of the deed restrictions is to prevent future residential use of the property. The restrictions will also include information identifying soil contamination, potential contaminant concentrations and associated exposure risk that are present after the Phase II RA is complete.

Section 4

Project Organization and Management

RMT, of Chicago, Illinois, will complete the Phase II RA outlined in this Workplan, under the direction of Riverdale. Riverdale's project coordinator is Dr. Peter Bibby. RMT's project manager is Rae Mindock.

RMT will be responsible for project coordination and management of Phase II RA. RMT will interface with the regulatory agencies in conjunction with Riverdale. Organization responsibilities specific to the construction of the asphalt engineered barrier are described in the Construction Quality Assurance Plan provided at Appendix B of this Workplan.

A summary of each key person's responsibilities is presented below:

Callie Bolattino
(On Scene Coordinator, USEPA)

- Overall responsibility for site activities associated with the Phase II RA for the USEPA.

Peter Bibby, Ph.D.
(Operations Manager, Riverdale)

- Represent Riverdale during Phase II RA activities.
- Conduct project review.
- Provide the lead for public communications that may be required.
- Coordinate final use plans.

Rae Mindock
(Project Manager, RMT, Inc.)

- Provide a focal point for communications between RMT and Riverdale.
- Retain original project documents.
- Distribute project documents to appropriate entities.
- Ensure that professional services are of adequate quality.
- Ensure that appropriate resources of RMT and laboratories are available as required for the project.
- Conduct overall project review of RMT and laboratories performance.

- Provide technical review and support as required during discussions with the USEPA.
- Provide overall project management and coordination between the project team and site activities.
- Provide overall project QC review.

Kathy Huibregtse, P.E.
(Project QA Officer, RMT, Inc.)

- Review project execution and outputs against good engineering practice.
- Provide overall project QA.

Brendan McLennan
(Phase II RA Task Leader)

- Coordinate site activities as required.
- Provide scoping and input to site related activities.
- Assist with the management of Phase II RA activities.

Construction Quality Assurance Engineer

- Provide overall construction QA for the Phase II RA.

Construction Contractor

- Implement the construction of the Phase II RA components.

Section 5

Progress Reports

USEPA will be provided monthly progress reports during the Phase II RA. Monthly progress reports will be submitted to USEPA, which will include the following:

- A description of the individual tasks and an estimate of the percentage completed
- Summaries and discussion of all findings
- Summaries and discussion of all approved changes made during the reporting period
- Summaries of all contacts with representatives of the local community, public interest groups, or local or State governments during the reporting period
- Summaries of all problems or potential problems encountered during the reporting period
- Actions being taken to rectify problems
- Changes in personnel during the reporting period
- Projected work for the next reporting period
- Copies of reports generated including, but not limited to, daily reports, inspection reports, and laboratory/monitoring data

Section 6

Project Schedule

The project schedule for the Phase II RA is expected to be completed prior to December 30, 2001. The Construction Completion Report will be submitted 30 days following the completion of field activities.

Section 7 References

Joseph A. Schudt & Associates, 2001, Site Improvement Program, May 31, 2001.

K&S Engineers, Inc., 2000, Geotechnical Exploration Report, August 25, 2000.

RMT, Inc., 2000, Phase I Removal Action Workplan, October 2000.

RMT, Inc., 2001, Phase I Removal Action Report, February 2001.

Terracon Inc., 2001, Geotechnical Engineering Report & Addendum, February 12, 2001.

Terracon Inc., 2000, Geotechnical Engineering Report, May 22, 2000.

U.S. EPA. 1984. Administrative Order of Consent for Immediate Response Measures.
September 28, 1984.

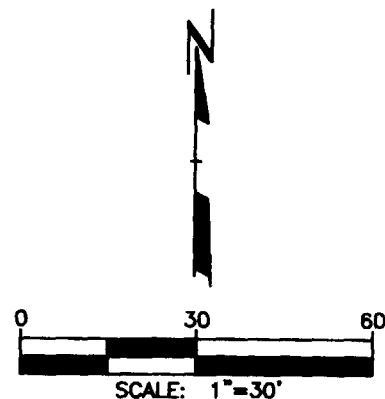
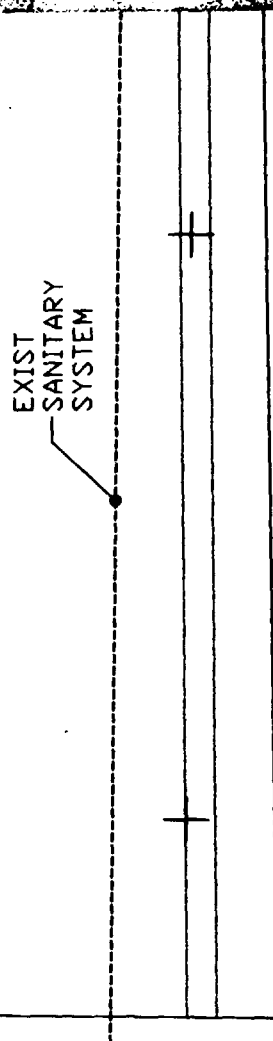
U.S. EPA. 1985. Administrative Order of Consent for Remedial Investigation/Feasibility
Study. Riverdale Chemical Company. Chicago Heights, Illinois. February 27, 1985.

U.S. EPA. 2000. Administrative Order of Consent for Phase I Removal Action. Riverdale
Chemical Company. Chicago Heights, Illinois. November 16, 2000.

**Table 3-1
Standard Testing Methods**

Designation Number	Standard Test Method
AASHTO	
T209	Maximum Specific Gravity of Bituminous Paving Mixtures (Illinois Modified)
TP53	Standard Test Method for Determining Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM	
C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
C39	Standard Test Method for Compressive Strength of Cylindrical Concrete
C138	Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
C143	Standard Test Method for Slump Hydraulic Cement Concrete
C172-99	Standard Practice for Sampling Freshly Mixed Cement
C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
D1559	Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
D2950	Density of Bituminous Concrete in Place by Nuclear Method
D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
D3549	Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens

FIGURES



3.				
2.				
1.				
NO.	BY	DATE	REVISION	APP'D.
PROJECT: RIVERDALE CHEMICAL COMPANY CHICAGO HEIGHTS, ILLINOIS				
SHEET TITLE: PHASE II RA PLAN				
DRAWN BY: PETRICKT		SCALE: 1"=30'		PROJ. NO. 4962.01
CHECKED BY:				FILE NO. 49620187.dwg
APPROVED BY:		DATE PRINTED:		FIGURE 3-1
DATE: JULY 2001				

Oversized maps can be viewed at U.S. EPA
Region V Superfund Records Center

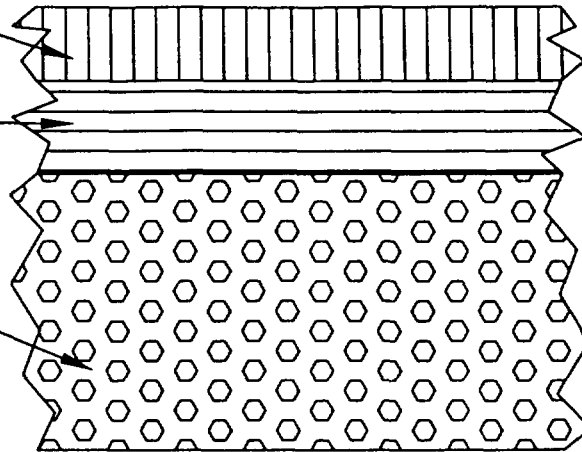
744 Heartland Trail
Madison, WI 53717-1934
P.O. Box 8923
Madison, WI 53708-8923
Phone: 608/831-4444

Attached Xref's: No xref's Attached.

2" CLASS I BITUMINOUS
SURFACE COURSE

2" CLASS I BITUMINOUS
BINDER COURSE

8" CA-6 TYPE B
AGGREGATE BASE
COURSE, USE ONLY IN
AREA 5.



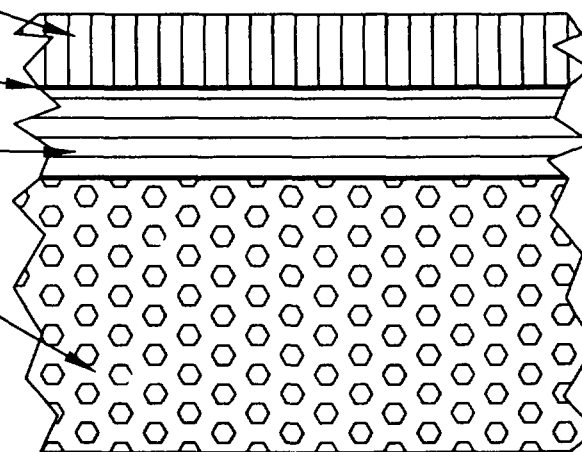
STANDARD PAVEMENT

2" CLASS I BITUMINOUS
SURFACE COURSE

REFLECTIVE CRACK
CONTROL TREATMENT

3" CLASS I BITUMINOUS
BINDER COURSE

10" CA-6 TYPE B
AGGREGATE BASE COURSE,
MIN. DEPTH OF STONE.
UTILIZE SCARIFIED AND
RECOMPACTED EXISTING
STONE TO BE NO MORE
THAN 5" OF AGGREGATE
BASE COURSE.



HEAVY DUTY PAVEMENT

PAVEMENT DETAILS

NOTE:
TENSAR GEOGRID BX1100
WILL BE PLACED ABOVE
EXISTING SUB-GRADE IF
SPECIFIED COMPACTION IS
NOT ACHIEVED.

**RIVERDALE CHEMICAL COMPANY
CHICAGO HEIGHTS, ILLINOIS**

RMT

DWN. BY:	PETRICKT
APPROVED BY:	
DATE:	JUNE 2001
PROJ. #	4962.01
FILE #	49620186.DWG

FIGURE 3-2

\$\$\$PLOTTER\$\$\$
\$\$\$SCALE\$\$\$
\$\$\$ROT\$\$\$
\$\$\$SYTIME\$\$\$

PLOT
\$\$\$DWG.
\$\$\$USER\$\$\$
\$\$\$PRF\$\$\$
\$\$\$PTABLE\$\$\$

Appendix A

Site Improvements Program Documents

**RIVERDALE CHEMICAL COMPANY
220 East 17th Street
Chicago Heights, IL 60411**

**Contract Conditions &
Specifications**

for

**RIVERDALE CHEMICAL
SITE IMPROVEMENT PROGRAM**

MAY 31, 2001

JAS #00-98

PREPARED BY:

**JOSEPH A. SCHUDT & ASSOCIATES
Civil Engineers ----- Surveyors
19350 South Harlem Avenue
Frankfort, IL 60423
(708)720-1000 (708)720-1065 FAX**

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GENERAL**SECTION I****GENERAL CONDITIONS**

The General Conditions of the Contract and the Special Conditions of the Contract forms are part of this specification, as if herein specifically set forth, and shall be referred to in detail by the Contractor.

SECTION II**SCOPE**

- A. All labor, equipment, tools, services, and materials necessary for or incidental to the construction and installation of the work shall be in conformance with these specifications.
- B. The Contractor's operation shall be conducted in such a manner as to protect the area as much as possible. The movement of materials and equipment outside of the proposed development shall be along routes designated by the Owner.

SECTION III**SPECIFICATION REFERENCES**

- A. The term "State Specifications", as used herein, refers to the State of Illinois, Department of Transportation, "Standard Specifications for Road and Bridge Construction", as of current at the date of this specification.
- B. Abbreviations used herein:
 - 1. A.S.T.M. - American Society for Testing Materials
 - 2. A.S.A. - American Standards Association, Inc.
 - 3. A.W.W.A. - American Water Works Association
- C. All work shall be in compliance with "Standard Specifications for Water and Sewer Main Construction in Illinois", Fifth Edition, 1996, except as herein modified and as additionally herein included.

SECTION IV

Contractor shall provide Owner with an affidavit signed by the manufacturer and/or material supplier certifying that all materials furnished to the Contractor for installation within the work, conform to the requirements of the contract specifications.

For all work in the City or State right-of-way, material testing shall be required. In addition, compaction testing will be required following placement of roadway and asphalt areas on and off the existing site.

SUMMARY OF WORK

PART 1 – GENERAL

SECTION I

SUMMARY

A. Section includes:

1. Project identification and contract summary.
2. Work awarded separately.
3. Owner-furnished material and equipment.
4. Project scheduling and coordination.
5. Contractor use of premises and existing facilities.
6. Owner occupancy.

SECTION II

PROJECT

- A. Project consists of asphalt paving of an existing and operating chemical manufacturing facility. Other improvements include additional storm sewer, two stormwater detention ponds, curb and gutter, and other miscellaneous items.

Riverdale Chemical Company
220 East 17th Street
Chicago Heights, IL 60411

SECTION III

OWNER

A. Owner of Project:

Riverdale Chemical Company
220 East 17th Street
Chicago Heights, IL 60411

Tom Siljkovic, Project Manager

CONTRACT FOR CONSTRUCTION

- A. Owner will award a Contract for Complete Construction to include general and site related improvements.

UNIT PRICES

- A. Unit prices are defined as prices per unit of measurement for materials or services as described in Bidding Documents for use in computing cost of work added to, or deducted from, the Contract Documents.

- B. "Schedule of Unit Prices", if applicable, is included in the Bid Form. Each unit price is defined by abbreviated language, recognizing that Drawings and Specifications sections document the requirements.

FUTURE CONTRACTS

- A. Owner reserves the right to award future separate contracts for project.

OWNER'S PROJECT MILESTONE DATES

- A. Project Milestone Dates will be determined and announced by the Riverdale Project Manager prior to bid due date.

PERMITS, FEES, AND NOTICES

- A. Refer to General Conditions, Article 4, for securing and payment of permits and fees.

PROJECT MEETINGS

- A. Owner will schedule periodic coordination meetings to discuss progress, coordination between Contractor and Owner's separate contractors, and problems that may have arisen. Each contractor performing work at site shall attend each meeting. Subcontractors and material suppliers shall attend upon request of Owner. Subcontractors, material suppliers, and other interested parties may attend.

INSPECTION OF WORK NOT IN CONTRACT

- A. Inspect work not in contract which is to receive or is adjacent to work of contract before commencing work. Do not proceed until conditions which would result in an inferior installation are satisfactorily corrected. Commencing work shall be construed as acceptance of work not in contract as satisfactory to receive work.

CONTRACTOR USE OF PREMISES

- A. Coordinate use of premises under direction of Owner. Confine operations and storage of material to areas assigned by Owner.
- B. Conduct operations to permit public access to existing attached and/or adjacent businesses occupied or under construction during the term of this contract.
- C. Cooperate with Owner in scheduling and executing work and site usage. Notify Owner as far as possible in advance of commencing work which may interfere with use of attached and/or adjacent buildings.
- D. Maintain public walks, driveways, and entrances in safe condition, free of equipment, material, and debris.

CUTTING AND PATCHING EXISTING CONSTRUCTION

- A. Remove, cut, fit, and/or patch old work as required to join new work to existing attached and/or adjacent construction.
- B. Remove and replace existing construction to remain which is loosened, cracked, or otherwise damaged or defaced as a result of work and is unsuitable for use intended.
- C. Patch existing defective or incomplete surfaces caused or exposed by work to match adjacent materials. Perform patching using skilled mechanics experienced in type of work involved. Conform to standards of Contract Documents where applicable; where not specified, conform to the highest standards of the trade.
- D. Provide temporary bracing, shoring, underpinning, and support during demolition, cutting, and new construction as necessary for execution of the work and protection of persons and property. Provide protective coverings and enclosures necessary to prevent damage to existing construction to remain.
- E. Salvage and material not specifically designed otherwise shall become property of Contractor and shall be removed promptly from site. Remove trash, debris, and other waste material promptly from site.

WORK ON OTHER PROPERTY

- A. Correct damage to existing property on or adjacent to site including, but not limited to, lawns, walks, pavement, roadways, structures, and utilities cut or damaged by construction and not designated for removal, relocation, or replacement during construction.
- B. Construct work occurring on public property according to governing laws, ordinances, rules, regulations, and orders of public authorities having jurisdiction.

FIELD ENGINEERING

PART 1 – GENERAL

OWNER'S RESPONSIBILITIES

- A. Owner will employ services of a land surveyor to lay out project. Surveyor will be registered in the State in which project is located, and will perform the following:
 - 1. Locate and mark property lines of site.
 - 2. Establish a convenient benchmark.

CONTRACTOR'S RESPONSIBILITIES

- A. Bench marks, control base line, and property lines may have been established on or adjacent to site. Replace monuments, property corners, or reference points disturbed or destroyed during work by employing a registered Professional Civil Engineer or registered Land Surveyor, without additional expense to Owner.
- B. Lay out and maintain reference points and additional bench marks necessary to accomplish work. Provide adequate reference points at all stages of construction to permit accurate placement of work. Each Subcontractor shall lay out his own work and be responsible for damage to his work or work of others caused by his errors or failure to check properly and verify measurements.
- C. At time of layout, verify locations and elevations of existing utilities at point of connection with new services by employing a registered Professional Civil Engineer or registered Land Surveyor, without additional expense to Owner.

GEOTECHNICAL DATA

PART 1 – GENERAL

INCORPORATED INFORMATION

- A. The following information incorporated in the Project Manual is supplied by the Owner for reference and is not part of Contract.
- B. Borings: Soil borings have been made at the site to assist in the design process. Soil Data and/or Logs are included in the documents for the information and convenience of Bidders.
- C. Data Use Limitations: Because the sub-surface conditions indicated by the borings are a sampling in relation to the entire construction area, and for other reasons, the Owner and the firm reporting the sub-surface conditions based on the borings do not warrant the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site.
- D. Bidder Responsibility: Persons using information described herein shall accept full responsibility for its use in preparing bids and obtaining additional geotechnical information which may be required.
- E. Extra Payment: No consideration for extra payment will be given for conditions occurring which could have been anticipated from the geotechnical information. If conditions occur resulting in extra work which could not have been anticipated or reasonably inferred from the geotechnical information, the Conditions of the Contract shall apply.

GEOTECHNICAL DATA

- A. Reproduced on the following pages are soil boring logs and report entitled:

Geotechnical Engineering Report & Addendum
Proposed Truck Parking Area
Riverdale Chemical Company
Chicago Heights, IL 60411

TI No. 56015003
Dated: February 12, 2001

Prepared by: Terracon Inc.
135 Ambassador Drive
Naperville, IL 60540

Prepared for: Joseph A. Schudt & Associates
19350 South Harlem Avenue
Frankfort, IL 60423

Geotechnical Engineering Report
Proposed New Building
Riverdale Chemical Company
Chicago Heights, IL 60411

TI No. 11005617
Dated: May 22, 2000

Prepared by: Terracon Inc.
135 Ambassador Drive
Naperville, IL 60540

Prepared for: Altra Builders, Inc.
650 Central Avenue
University Park, IL 60466

Geotechnical Exploration Report
Proposed 1-Story, Pre-Engineered Building
Riverdale Chemical Company
Chicago Heights, IL 60411

File No. 5961
Dated: August 25, 2000

Prepared by: K & S Engineers, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Prepared for: Magnum Construction Services, Inc.
15020 Iowa
Crown Point, IN 46307

ALTERNATES

PART 1 - GENERAL

SUMMARY

- A. Section includes: Administrative and procedural requirements governing Alternates.

DEFINITIONS

- A. Definition: An alternate is an amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
1. The cost or credit for each alternate is the net addition to or deduction from the Subcontract Sum to incorporate the alternate into the work. No other adjustments are made to the Subcontract Sum.

PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely and fully integrate the alternate into the project.
1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the alternate.
- B. Notification: Immediately following the award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate whether alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of this Subcontract.
- D. Schedule: A "Schedule of Alternates" is included at the end of this section. Specification Sections referenced in the schedule contain requirements for materials necessary to achieve the work described under each alternate

PART 2 - EXECUTION

SCHEDULE OF ALTERNATES

- A. For separate Addenda if required.

COORDINATION AND MEETINGS

PART 1 – GENERAL

SUMMARY

- A. Section includes:
1. Coordination.
 2. Field engineering and layout.
 3. Cutting and patching.
 4. Progress and coordination meetings.
 5. Preinstallation conferences.
 6. Coordination documentation.

COORDINATION

- A. Coordinate scheduling, submittals, and work with that of the Owner, Contractor and other subcontractors to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the work.

FIELD ENGINEERING AND LAYOUT

- A. Contractor will provide primary control and reference points including the following:
1. One elevation benchmark at site perimeter.
 2. Property corners or other minimum points required to establish horizontal control.
 3. Minimum points required to establish horizontal control for layout.
- B. Provide all additional control points, lines, elevation benchmarks, grade stakes, and layout required for the work of Subcontract.
- C. Protect survey control points during construction.
- D. Promptly report to Owner the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Promptly notify Contractor of any discrepancies discovered.

PROGRESS AND COORDINATION MEETINGS

- A. When directed by Owner, attend progress and coordination meetings at project site or other location selected by Contractor.
- B. Attendance required: Office management and field supervision; design staff when appropriate.
- C. Fully prepare to respond to agenda items relating to work of Subcontract:
 - 1. Review of project schedule.
 - 2. Review of unresolved items from previous meetings.
 - 3. Coordination of field installations.
 - 4. Maintenance of safety, quality, and work standards.
 - 5. Other business relating to work.

PREINSTALLATION CONFERENCES

- A. When required in individual specification section, or when directed by Contractor, attend a preinstallation conference prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the section.

CONSTRUCTION SEQUENCE

- A. The construction sequence will be as follows:
 - 1. East Detention Basins.
 - 2. West Detention Basins, Storm Sewer, and Concrete Cover.
 - 3. Area 1 Paving.
 - 4. Area 2 Paving.
 - 5. Area 3 Paving.
 - 6. Area 5 Paving.
 - 7. Area 4 Paving.

PART 2

SPECIFICATIONS FOR EXCAVATION

SECTION I

GENERAL CONDITIONS

The General Conditions of the Contract and the Special Conditions of the Contract forms are part of this specification, as if herein specifically set forth, and shall be referred to in detail by the Contractor.

SECTION II

SCOPE

- A. All labor, equipment, tools, services, and materials necessary for or incidental to the construction and/or installation of earthwork shall be furnished and installed in conformance with the following specifications.
- B. Earthwork includes (but is not limited to) the following:
 - 1. Vegetation clearing and topsoil stripping for the eastern detention basin areas.
 - 2. Installation and maintenance of all erosion control materials.
 - 3. Excavation, embankment, finished subgrading for pavement and detention areas.
 - 4. Shaping and compacting the subgrade of all parking lots for the construction of all pavements, including removal of all excess underground utility excavation spoil to within 0.10 of plan elevation.
 - 5. Maintenance of existing site drainage until permanent drainage is completed and operational.
 - 6. Backfilling and shaping and grading all landscape and detention areas indicated on the plans, including the distribution and shaping of a minimum of 6 inches of topsoil to the depths and elevations indicated.
 - 7. The furnishing of all materials for construction.
 - 8. The disposal of all surplus excavated materials. Some excess stone material will be allowed to be compacted within the northeast section of stone parking lot.
 - 9. Installation of seeding and erosion control blanket.
- C. The Contractor's operation shall be conducted in such a manner as to protect the areas as much as possible. The movement of materials and equipment outside of the proposed project shall be along routes designated by the Owner.

SECTION III

SPECIAL CONDITIONS

A. SPECIFICATIONS

The work shall be done in compliance with the Illinois Department of Transportation "Standard Specifications for Road and Bridge Construction in Illinois" (Standard Specifications), adopted July 1, 1997, except as herein modified and/or as additionally herein included.

CONSTRUCTION

A. CONSTRUCTION SEQUENCE AND SCHEDULE

The construction sequence will be as follows:

1. East Detention Basins and Storm Sewer.
2. West Detention Basins, Storm Sewer, and Concrete Cover.
3. Area 1 Paving.
4. Area 2 Paving.
5. Area 3 Paving.
6. Area 5 Paving.
7. Area 4 Paving.

B. CLEARING

Clearing shall consist of the removal and disposal of all brush and other vegetation within the project site. A U.S. Army Corps of Engineers permit has been granted for the area indicated as the east detention basin (Corp Permit No. 200100604).

C. TOPSOIL EXCAVATION

Topsoil excavation shall consist of the excavation, removal, transportation, and stockpiling of all topsoil or other unsuitable earth taken from the project. Topsoil excavation shall also include respreading and shaping topsoil where required in landscaped and detention areas to the grades, depths, and elevations indicated on the construction plans. Excess topsoil beyond that required for respread in the landscape and detention areas shall be removed from the site at the Contractor's expense.

D. EARTH EXCAVATION

Earth excavation shall consist of the excavation, removal, transportation, shaping, and compacting of all subgrade areas on the project.

Any and all additional fill required to provide the lines and grades indicated on the improvement plans is a part of this Contract and is to be provided at the Contractor's expense.

Prior to the placement of new fill, the existing stone should be scarified to a depth of about 9 inches, moisture conditioned, and recompact to 98% maximum dry density. The subgrade should be proofrolled. Proofrolling of the compacted subbase shall be with a fully loaded tandem-axle dump truck with a minimum weight of 25 tons.

All fill in landscape and detention areas shall be placed in uniform layers not exceeding eight (8) inches in loose thickness with each layer being compacted to ninety (90) percent of the maximum dry density determined from the ASTM D-1557 (modified proctor) method of test.

Landscape and detention areas shall be left six (6) inches below finished grade for topsoil placement. All exposed topsoil shall be covered seeded with IDOT Type 4A Low Profile Native Grass seed mixture and covered with excelsior blanket.

E. SPECIAL WASTE

PAYMENT

Payment shall be made on the basis of a Lump Sum Contract.

SECTION IV

CONSTRUCTION:

Earthwork and erosion control shall be constructed in accordance with Section 200 of the Standard Specifications, except as modified herein. Erosion Control systems shall be constructed in accordance with Art. 280 and as shown in the Contract Drawings.

A. SITE PREPARATION

Site shall be cleared and all trees removed within limits shown on Contract Drawings. All tree stumps shall be removed to 2 feet below proposed subgrade, and all organic material disposed of off-site.

Vegetation and organic topsoil shall be removed from all cut and fill areas, and sufficient topsoil stockpiled for respread as shown. All exposed clay, sand, and silt in pavement fill areas shall be proof rolled with fully loaded tandem axle truck in presence of Soils Engineer and soft and loose zones identified. All existing areas to be paved will be scarified to a depth of 9 to 12 inches and recompact or undercut and replaced with new compacted fill as directed by Soils Engineer.

All fill shall be placed in 6 to 8 inch loose lifts and pavement sections compacted to 100% Standard Proctor.

B. ACCESS

The site is a fully operating manufacturing facility. Work will be coordinated with Owner to ensure prompt, timely, and orderly closure and reopening of the areas of work.

SPECIFICATIONS FOR TRENCH DRAIN

SECTION I

GENERAL CONDITIONS

The General Conditions of the Contract and the Supplementary Conditions of the Contract forms are part of this specification, as if herein specifically set forth, and shall be referred to in detail by the Contractor.

SECTION II

SCOPE

- A. All labor, equipment, tools, services, and materials necessary for or incidental to the construction and/or installation of earthwork shall be furnished and installed in conformance with the following specifications.

B. Manufactured Trench Drains

Trench drains shall be a pre-engineered, manufactured system that conforms to the design loading requirements of AASHTO H-20 and HS-20 with the following requirements:

1. A method of forming a round bottom channel pre-sloped to a minimum of .5% (1/16" per foot) installed in standard eight foot sections.
2. A steel, cast iron, or ductile iron frame with anchors at 45 degrees into the surrounding concrete.
3. A cast iron or ductile iron grate conforming to Federal Specification RR-F-621C.
4. A locking device which directly connects the grate to the frame.

Acceptable systems are:

EconoDrain™; Series #8 with steel frame and grate #EG-0824-DI-B by MultiDrain Systems (800) 433-1119.

Flo-Thru™; Model Z-886 with steel frame and grate #Z-812-CG by Zurn. (716)665-1132.

ACO Drain™; FG200 with steel frame and 10" ductile iron grate by ACO (216)285-7000.

Alternate systems must be submitted for approval prior to the bid date.

**SPECIFICATIONS FOR
STORM SEWER****SECTION I****GENERAL CONDITIONS**

The General Conditions of the Contract and the Supplementary Conditions of the Contract forms are part of this specification, as if herein specifically set forth, and shall be referred to in detail by the Contractor.

SECTION II**SCOPE**

- A. All labor, equipment, tools, services, and materials necessary for or incidental to the construction and installation of the storm sewer and shall be in conformance with the following specifications.
- B. Storm sewer includes (but is not limited to) the following.
 - 1. The furnishing of all materials of construction;
 - 2. clearing easement areas of trees and brush as necessary for installation of storm sewers;
 - 3. all trenching, excavation, and backfill required for the construction and installation of all storm sewers and other related or companion appurtenances;
 - 4. the installation and testing of all storm sewers;
 - 5. the cleaning of the improvement area to the conditions that existed prior to construction of the improvements;
- C. The Contractor's operation shall be conducted in such a manner as to protect the area as much as possible. The movement of materials and equipment outside of the proposed development shall be along routes designated by the Owner.

SECTION III**SPECIFICATION REFERENCES**

- A. The term "State Specifications" as used herein, refers to the State of Illinois, Department of Transportation, "Standard Specifications for Road and Bridge Construction" adopted January 1, 1997.
- B. Abbreviations used herein.
 - 1. A.S.T.M. American Society for Testing Materials
 - 2. A.S.A. American Standards Association, Inc.
 - 3. A.W.W.A. American Water Works Association
 - 4. A.A.S.H.T.O. American Association of State Highway and Transportation Officials

SECTION IV

GENERAL SPECIFICATIONS

All work shall be in compliance with "Standard Specifications for Water and Sewer Main Construction in Illinois" Fifth Edition, May 1996, except as herein modified and as additionally herein included.

A. MATERIALS

Materials shall be approved by the Engineer prior to installation.

1. STORM SEWER PIPE - Storm sewer pipe shall comply with the following material specifications:

<u>PIPE DIAMETER</u>	<u>PIPE SPECIFICATIONS</u>	<u>JOINT SPECIFICATIONS</u>
12 thru 48 inch	Reinforced Concrete Culvert Pipe Type 2, ASTM C-76	Continuous O-Ring Gaskets ASTM C-443

2. STEEL CASING PIPE - Steel casing pipe shall comply with the following material specifications:

PIPE

<u>DIAMETER</u>	<u>PIPE SPECIFICATIONS</u>	<u>JOINT SPECIFICATIONS</u>
14 thru 42	Welded Steel ASTM C200	None

3. MANHOLES, CATCHBASINS, INLETS, AND VALVE BASINS - Manholes, catchbasins, inlets, and valve basins shall be made with precast concrete rings ASTM C-478 with internal diameters as shown on the Contract Drawings. Frame and lid shall be made of cast iron in the types and styles as shown on the Contract Drawings. Joints between concrete ring sections for storm sewers to be made by using Bituminous Joint Sealer, Mastic Type, as specified by "State Specifications". Joints between concrete ring sections for sanitary sewers shall be sealed with gaskets conforming to ASTM C-443. The word "SANITARY", "STORM", or "WATER" shall be cast into the lids for identifying the type of structure.
4. PRECAST REINFORCED CONCRETE FLARED END SECTIONS - Precast reinforced concrete flared end sections shall conform to State of Illinois Standard Number 542301. Poured concrete toe block shall be required per the State of Illinois Standard Drawing. Flared end sections shall include gratings conforming to State of Illinois Standard Number 542311.

Space between sides of storm sewer and the trench wall up to the springline of the pipe shall be backfilled with granular bedding material.

The remainder of on-site trenches shall be backfilled using material originally excavated. All utility trenches constructed under pavement shall be backfilled with selected granular backfill. Selected granular backfill shall be CA-7 type as defined in State Specifications. Material shall be placed and compacted in accordance with Article 550.07.

Excess utility spoil shall be removed from the site. All areas disturbed during construction of the contract improvements shall be cleaned up with trench areas backfilled and compacted to the grades which existed prior to construction.

B. TESTING

All defect observed shall be repaired to the satisfaction of the Owner. All repair work necessary shall be considered incidental to the construction of the sewer or water system.

C. RECORDS

The Contractor shall furnish one (1) set of record drawings to the Owner at the completion of construction of the sanitary sewer, storm sewer, and water systems showing the record length of the sewer between manholes, wye, tee, valves, hydrants, bend and service stub locations, and any deviations from the project plans.

D. MEASUREMENT AND PAYMENT

Payment shall be made on the basis of a Lump Sum Contract.

ASPHALTIC CONCRETE PAVEMENT PLACEMENT AND MAINTENANCE**SECTION I****GENERAL CONDITIONS**

The General Conditions of the Contract and the Special Conditions of the Contract forms are part of this specification, as if herein specifically set forth and shall be referred to in detail by the Contractor.

SECTION II**SCOPE**

- A. Preparing crushed limestone subgrade, installing asphaltic concrete pavement in accordance with the lines and grades shown on the Drawings.

REFERENCES

- A. The Asphalt Institute – Manual MS-4 – The Asphalt Handbook.
1. The Asphalt Institute – Manual MS-13 – Asphalt Surface Treatments and Asphalt Penetration Macadam.
 2. The Asphalt Institute – IS-91 – Full Depth Asphalt Pavements for Parking Lots, Service Stations, and Driveways.
 3. ASTM D946 – Specifications for Penetration – Graded Asphalt Cement for Use in Pavement Construction.
 4. ASTM D698 – Standard Test Methods for Moisture Density Relations of Soil and Soil-Aggregate Mixtures using 5.518 Rammer and 12 Inch Drop: Standard Proctor.
 5. State of Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction (1997 Edition).

PERFORMANCE REQUIREMENTS

- A. Paving designed to withstand truck traffic of up to 60,000 lbs (40 tons). Expect approximately 30 trucks per day.

QUALITY ASSURANCE

- A. Perform the work in accordance with State of Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction (1997 Edition).
- B. Mixing plant: Conform to State of Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction (1997 Edition).
- C. Obtain materials from the same source throughout project life.

- D. Inspect the Work physically to assure no cracking or breaking is apparent in the pavement that would allow infiltration.
- E. Immediately after placement, protect pavement from mechanical injury for a period not less than 48 hours after the final application in accordance with the State of Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction (1997 Edition), Section 406.22.

NECESSARY REPAIRS

- A. Repair, as necessary, any apparent cracking or breaking in the asphaltic concrete pavement.

PRODUCT & MATERIALS

- A. Crushed stone base course: Illinois DOT CA6 coarse aggregate base course, or similar aggregate approved by Owner's representative containing no debris, roots, frozen materials, or organic matter and meeting the Section 1004 of IDOT Standard Specifications for Road and Bridge Construction (1997 Edition).
- B. Bituminous material: Provide mix design for approval by Owner. Mix design should meet the requirements of Section 1.3 of this specification meeting IDOT Specification for Class 1 Type 1 Bituminous Binder or Surface (Article 406).
- C. Seal coat: Illinois DOT Class A-1 according to the State of Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction (1997 Edition), Section 403 or an approved equivalent.

EXECUTION

ASPHALT INSTALLATION

DRAINAGE

- A. At all times during construction, temporarily provide, place, and maintain ample means and devices with which to promptly remove and properly dispose of all water entering the Work.
- B. Grade in such a manner as to direct rain water away from the limits of the Work. Standing or puddling of water on-site is unacceptable. Do not create a situation between areas of finished work and unfinished work that will cause standing or puddling of water.

EXISTING SUB-BASE

- A. Areas not excavated shall be scarified and compacted by vibratory methods.
- B. Proof roll with soil testing firm present. If base fails, proof roll and a minimum of 5 inch additional stone is necessary, remove 5 inch stone, lay Tensar geogrid BX1100 or equal and recompact stone. Add stone as necessary to reach subgrade in lifts of no more than 9 inches compacting to 95% standard proctor.

CRUSHED AGGREGATE BASE COURSE

- A. Place crushed stone to achieve an overall minimum depth of 6 inches.
- B. Mechanically compact lower lift prior to placing upper lift.
- C. Verify that compacted subgrade is dry and no subsidence occurs under imposed loads that may compromise the integrity of the paving.
- D. Proof roll stone base course to confirm integrity prior to paving.

ASPHALTIC MATERIAL

- A. Place binder course and wearing to full compacted thickness in one pass.
- B. Place reflective crack control treatment according to Section 443.
- C. Place wearing course within 2 hours of placing and compacting binder course.
- D. Place asphaltic concrete to minimum overall thickness determined by mix design.
- E. Match grades indicated by Owner.
- F. Compact paving by rolling. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- G. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.
- H. To ensure an impermeable seal and minimize joint seepage, offset individual course joints so no coinciding layers share coinciding joints.

INSPECTION AND REPAIRS**INSPECTION**

- A. Inspect asphaltic pavement quarterly.

- B. Document each inspection occurrence, noting any physical changes in the asphaltic concrete pavement. Maintain a copy of each inspection report.
- C. Verify gradients and elevations of base are consistent, and that no subsidence has occurred.

REPAIRS

- A. Promptly route, clean, and seal any cracking in the asphaltic concrete paving according to the State of Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction (1997 Edition), Section 451.
- B. Promptly patch any breaking in the asphaltic concrete paving according to the State of Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction (1997 Edition), Section 442.

**SPECIFICATIONS FOR
STORM DRAINAGE DETENTION & EXFILTRATION
Rainstore3 Technical Specification
With Geotextile Fabric Liner**

SECTION I

GENERAL PROVISIONS

The General Conditions of the Contract and the Special Conditions of the Contract forms are part of this specification, as if herein specifically set forth and shall be referred to in detail by the Contractor.

SECTION II

DESCRIPTION OF WORK

A. Work Included:

- A. Provide and install excavation and base preparation per Geotechnical Engineer's recommendations and/or as shown on drawings, to provide adequate support for project designs loads and safety from excavation sidewall collapse. See 2.02 Materials.
- B. Provide Rainstore3 system products including Rainstore3 units, geotextiles, geogrids, inlet and outlet pipe with connections and installation per the manufacturer's instructions furnished under this section.
- C. Related Work:
- D. Subgrade excavation and preparation under Section 02300 - Earthwork.
- E. Subsurface drainage materials - Section 02700 - Subsurface Drainage and Structures, as needed.

QUALITY ASSURANCE

- A. Follow State Standard Specifications and the Specifications for Quality Control.
- B. Installation: Performed only by skilled work people with satisfactory record of performance on pipe, chamber, or pond/landfill construction projects of comparable size and quality.

SUBMITTALS

- A. Submit manufacturer's product data and installation instructions.
- B. Submit a 20" x 20" section of Rainstore3 product for review. Reviewed and accepted samples will be returned to the Contractor.
- C. Submit material certificates for geotextile, geogrid, base course and backfill materials.

DELIVERY, STORAGE, AND HANDLING

- A. Protect Rainstore3 cells from damage during delivery and store under tarp when time from delivery to installation exceeds one week. Storage should occur on smooth surfaces, free from dirt, mud and debris.
- B. Handling is to be performed with equipment appropriate to the size (height) of cells and site conditions, and may include, hand, handcart, forklifts, extension lifts, small cranes, etc., with care given to minimize damage to spacer bars surrounding cells.

PROJECT CONDITIONS

- A. Review installation procedures and coordinate Rainstore3 work with other work affected, such as grading, excavation, utilities, construction access, erosion control to eliminate unnecessary traffic over the completed Rainstore3 installation, especially with loads greater than design loads.
- B. Cold weather:
 - A. Do not use frozen materials or materials mixed or coated with ice or frost.
 - B. Do not build on frozen work or wet, saturated or muddy subgrade.
 - C. Care must be taken when handling Rainstore3 cells when air temperature is at 40 degrees or below as plastic becomes brittle.
 - D. Protect partially completed Rainstore3 installation against damage from other construction traffic when work is in progress, and following completion of backfill, with highly visible construction tape, fencing, or other means until construction is complete.
 - E. Protect adjacent work from damage during Rainstore3 installation.

SECTION III

PRODUCT AVAILABILITY

- A. Manufacturer: (Rainstore3) Invisible Structures, Inc., 20100 East 35th Drive, Aurora, Colorado 80011. Call from USA and Canada 800-233-1510 toll free, (International 303-373-1234), Fax 800-233-1522 (International 303-373-1223).

MATERIALS

- A. Base of Excavation: Shall be smooth, level and free of lumps or debris IDOT CA-11 base. Compact to at least 100% Standard Proctor or as required by Engineer.
- B. Geotextile: Shall be non-woven PP or PET with a weight of at least min. 6 oz per square yard, appropriate for the soil type and depth conditions, placed on the floor of the excavation with allowances to continue up all sides of the cellular structure to provide protection of the geomembrane liner from backfill materials.
- C. Rainstore3 Cells: Injection molded plastic units 1x1x0.1 m (40"x40"x4") high, 0.1 m³ each) nested into vertical cell structures of variable height (custom for each project) consisting of hollow rings rising from a strong open grid Unit weight = 6.4 kg (14.2 lb.), volume = 6% solid.
- D. Side Backfill: Use IDOT CA-11 gradation stone backfill, free from lumps and debris or any other sharp materials to backfill along the sides of the cellular structure, taking care to compact with powered mechanical compactor, in lifts that do not exceed 12", to provide a settlement-free surface over the top and sides of the structure. Compaction to be 100% Standard Proctor.
- E. Geogrid: Use geogrid product, such as Tensar BX1100, or equal, to overlay the completed liner, extending at least 40" beyond the edge of the structure, or side backfill, whichever is greater, with joints overlapped by at least 12".
- F. Top Backfill: Use 12" minimum to 36" maximum depth of 3/4" minus sandy/gravel roadbase material (IDOT CA-7, or CA-11 gradation). Top Backfill will be graded to subgrade for the construction for a concrete final surface.

SECTION IV

EXECUTION INSPECTION

- A. Examine prepared excavation and conditions for smoothness, compaction and level. Do not start Rainstore3 installation until unsatisfactory conditions are corrected. Check for presence of high water table, which must be kept at levels below the bottom of the Rainstore3 structure at all times.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact the Project Engineer, and owner for resolution.

PREPARATION

- A. Place geotextile over prepared grade, with any joints overlapped by a minimum of 12". Place fabric for sides a minimum of 40" inside the outer perimeter of the structure prior to placement of the liner. Protect sides and top segments from damage while Rainstore3 cells are placed.

INSTALLATION OF RAINSTORE3 CELLS

- A. Install Rainstore3 cells by placing side by side, with either grid side down or up. Try to place sides of cells without damaged bumpers along outside of structure to resist backfill forces against fabric and liner materials. Take care to avoid damage to fabric liner material during placement.
- B. After placement of Rainstore3 cells, bring liner material up the sides and over the top of the structure, overlapping or sealing joints per manufacturers recommendations. Fold excess fabric at corners to lay flat against sides of structure, securing folds and seams with staples or similar methods.
- C. Identify locations of inlet, outlet, inspection ports, and any other penetrations of the liner, securing pipe into prefabricated boots with stainless steel pipe clamps. Support pipe in trenches and during backfill operations to prevent damage to liner or pipe.
- D. Use a powered mechanical compactor to conduct backfill operations on structure sides with care to avoid damage to liner while providing required compaction forces to the top level of the structure.
- E. Place the geogrid layer over the top of the structure, extending beyond the edge of the structure at least 40 inches, or over the entire side backfill area, which ever is greater. Any joints must be overlapped by a minimum of 12".
- F. Place sandy gravel backfill material over geogrid, in 6" lifts, compacting with vibrating roller compactor to a minimum of 95%, to a minimum depth of 12" and a maximum depth of 36". Take care to place backfill on top of structure and avoid damage to structure or liner, using low pressure tire or track vehicles.
- G. Place surfacing paving materials over the structure with care.

CLEANING

- A. Perform cleaning during the installation of work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

**SPECIFICATIONS FOR
EROSION AND SEDIMENT CONTROL**

SECTION I

GENERAL CONDITIONS

The General Conditions of the Contract and the Supplementary Conditions of the Contract forms are part of this specification, as if herein specifically set forth, and shall be referred to in detail by the Contractor.

SECTION II

SCOPE

- A. Section includes:
- a. Temporary erosion and sediment control.
 - b. Permanent erosion control and seeding

SECTION III

RELATED ITEMS

- A. Specifications for excavation, sewer, and granular materials.
- B. State of Illinois Standard Specification Section 280

REGULATORY REQUIREMENTS

- A. Comply with requirements of state, regional, and local erosion and sediment control authorities.

PRODUCTS

A. **BALES**

- 1. Tightly bound bales of unrotted hay, straw, or other grass locally available from recent cuttings.

B. **BALES ANCHORAGE**

- 1. Anchorage: ½ inch diameter by 30 inch steel reinforcing rods or 2 inch x 2 inch x 30 inch wooden stakes, two per bale.

C. **MATTING**

- 1. Jute: Cloth or plain weave, undyed and unbleached single jute yarn, 47 inches to 49 inches wide, averaging to 1.26 lbs. Per

2. Excelsior: Wood excelsior 47 inches to 49 inches wide, 0.72 to 0.88 lbs. Per square yard covered with netting.

D. MATTING STAPLES

1. No. 8 plain wire, 6 inches to 10 inches long.

E. MULCH

1. Unrotted small grain straw or wood chips $\frac{3}{4}$ inch to 1 $\frac{1}{2}$ inch diameter. Bind mulch together by netting or liquid binder (cut back or emulsified asphalts, or synthetic binder).

SECTION IV

EXECUTION

A. INSTALLATION

1. Install temporary erosion and sediment control items prior to clearing and excavation or as soon as practical as excavation progresses.

B. MAINTENANCE

1. Maintain erosion and sediment control items until final project acceptance. Repair breaches and replace deteriorated or missing items immediately after discovery.
2. Clean sedimentation basins and catch basins as required to maintain effectiveness or as otherwise directed.
3. Sediment shall be removed from all structures before the completion and final acceptance of the improvements by the owner. Washing the sediment downstream is not acceptable.

C. REMOVAL

1. Remove temporary erosion control items as directed and prior to project closeout.

FIBROUS REINFORCING

SECTION I

GENERAL CONDITIONS

The General Conditions of the Contract and the Supplementary Conditions of the Contract forms are part of this specification, as if herein specifically set forth, and shall be referred to in detail by the Contractor.

SECTION II

SCOPE

- A. Section includes: Fibrous concrete reinforcement.

Specifier Note: Revise paragraph below to suit project requirements. Add section numbers and titles per CSI MasterFormat and specifier's practice.

- A. Related Sections: Section(s) related to this section include:

1. Reinforcing Steel: Division 3 Concrete Reinforcement Sections.
2. Cast-in Place Concrete: Division 3 Cast-in-Place Concrete Sections.
3. Precast Concrete: Division 3 Precast Concrete Sections.

SECTION III

REFERENCES

- A. General. Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title, or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
- B. American Society for Testing and Materials (ASTM):
1. ASTM C1399-98 – Test Method for Determining Average Residual Strength of Fiber Reinforced Concrete.
 2. ASTM C94 – Standard Specification for Ready-Mixed Concrete.
 3. ASTM C1116 – Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
 4. ASTM C1018 – Standard Test Method for Flexural Toughness and First Crack Strength of Fiber-Reinforced Concrete (Using Beam with Third-Point Loading).
 5. ASTM E119 – Standard Method of Fire Tests of Building Construction Material.
- C. American Concrete Institute (ACI):

1. ACI 211.1 – Standard Practices for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
 2. ACI 318 – Building Code Requirements for Reinforced Concrete.
 3. ACI 544.1R – State-of-the-Art Report of Fiber-Reinforced Concrete.
 4. ACI 544.2R – Measurement of Properties of Fiber-Reinforced Concrete.
- D. American Society of Civil Engineers (ASCE):
1. ASCE 9 – Standard Practice for the Construction and Inspection of Composite Slabs.
- E. Omega Point Laboratories, Inc. (OPL):
1. OPL Directory of Listed Building Products, Materials, and Assemblies.
- F. Synthetic Industries, Inc. (SI):
1. FM-129 – Standard Test Method for Residual Strength of Fiber-Reinforced Concrete.
- G. Underwriters Laboratories, Inc. (UL):
1. UL Fire Resistance Directory.

SYSTEM DESCRIPTION

- A. Performance Requirements: Provide fibrous concrete reinforcement which has been manufactured and mixed with concrete to achieve performance criteria stated by manufacturer without defects, damage, or failure.
1. Fibrous concrete reinforcement materials provided in this section shall produce concrete conforming to the requirement for each type and class of concrete required, as indicated on the drawings and specified in Division 3 Concrete Sections in conformance with ASTM C94; ASTM C1116, Type III, 4.1.3; ASTM C1018, Performance Level 1; and ASTM C1399-98 ≥ 50 psi (344.5 kPa).

SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Sections.
1. Printed data should state a minimum amount of fiber to be added to each type of concrete.
- B. Product Data: Submit product data, including manufacturer's SPEC-DATA product sheet, for specified products.
1. Indicate proposed fibrous concrete reinforcement materials including application rate per cubic yard of concrete.
 2. Include manufacturer's printed batching and mixing instructions.

3. Submit list of projects completed within the last ten years under the same trade name and manufacturer.
4. Submit list of projects with a satisfactory history of the reinforcing material with an experience period of no less than ten years under the same trade name and manufacturer.

GRADE RAILROAD CROSSINGS**SECTION I****GENERAL CONDITIONS**

The General Conditions of the Contract and the Supplementary Conditions of the Contract forms are part of this specification, as if herein specifically set forth, and shall be referred to in detail by the Contractor.

SECTION II

Where called for on the plans and /or by the Engineer, grade crossings shall be installed. Each grade crossing shall have creosoted hardwood guard timbers on both sides of the rail. These treated timbers shall be 8 or 10 inches wide and of sufficient length to provide a safe crossing for the roadway width by the appropriate depth in accordance with the Standard Crossing Plans 5-12 and 5-12A in the details. Full-Depth Asphalt paving shall be used between the rails and for a minimum distance of 10 feet on both sides of the centerline of the track. This asphalt paving shall be hot mix and shall meet the requirements of the governmental agency having jurisdiction.

Drive screw spikes of appropriate length for the timbers being used shall be used to install guard timber as per the Company's Standard Crossing Plans attached.

**SPECIFICATIONS FOR
CURB AND GUTTER AND CONCRETE PAVING**

SECTION I

GENERAL CONDITIONS:

The General Conditions of the Contract and the Special Conditions of the Contract forms are part of this specification, as if herein specifically set forth, and shall be referred to in detail by the Contractor.

SECTION II

SCOPE:

1. All labor, equipment, tools, services, and materials necessary for or incidental to the construction and/or installation of the pavement surfacing shall be furnished and installed in conformance with the following specifications.
2. Pavement surfacing shall include (but is not limited to) the following:
 - a. The furnishing of all materials of construction;
 - b. the construction of all curb and gutter, sidewalks, medians, and concrete pavement;
3. The Contractor's operation shall be conducted in such a manner as to protect the area as much as possible. The movement of materials and equipment outside of the proposed subdivision shall be along routes designated by the Owner.

SECTION III

SPECIFICATIONS:

The work shall be done in compliance with the State of Illinois, Department of Transportation, "Standard Specifications for Road and Bridge Construction" herein referred to as the "State Specifications", except as herein modified and/or as additionally herein included.

1. SUBGRADE

The work shall be processed in compliance with Section 212, State Specifications, and shall basically consist of shaping and final compaction of the subgrade for the construction of the pavement base and surface courses.

Rough grading, including such minor excavation and filling as may be necessary to establish the parking area grades as designated on the contract drawings, shall be the responsibility of this contract.

The General Contractor and the Engineer shall be notified prior to performing the extra work.

The backfilling of all curbs is included in this item.

At all times during construction, temporarily provide, place, and maintain ample means and devices with which to promptly remove and properly dispose of all water entering the Work.

Grade in such a manner as to direct rain water away from the limits of the Work. Standing or puddling of water on-site is unacceptable. Do not create a situation between areas of finished work and unfinished work that will cause standing or puddling of water.

Areas not excavated shall be scarified to a minimum depth of 9 inches and compacted by vibratory methods.

Proof roll with soil testing firm present. If base fails, proof roll and a minimum of 5 inch additional stone is necessary, remove 5 inch stone, lay Tensar geogrid BX1100 or equal and recompact stone. Add stone as necessary to reach subgrade in lifts of no more than 9 inches compacting to 95% standard proctor.

2. CURB AND GUTTER, SIDEWALK, AND CONCRETE SWALE

This work shall be processed in compliance with Section 606, State Specifications, and consists of installing concrete curbs and gutters, depressed curbs and gutters, concrete median and rumble medians, and concrete ditch.

All work shall be placed on a cushion of two (2) inches of fine aggregate unless placed with a curb machine in which case the granular cushion may be eliminated.

All concrete shall used shall consist of the use of 100% Virgin Colated, fibrillated polypropylene fiber, Fibremesh, according to the manufacturers recommendations. This reinforcing methods is in addition to, and not a replacement for standard steel reinforcement.

Construction joints shall be provided every fifteen (15) feet, expansion joints every one hundred-fifty (150) feet maximum, and at each change in vertical or horizontal alignment, and at cold joints.

Concrete curb that is called to be placed against any existing building or structure shall include the preparation of an expansion joint against the building. The exposed joint shall be left ¼ inch below top of concrete and shall be sealed with an epoxy sealant.

3. AGGREGATE BASE COURSE

The aggregate base course shall be constructed in accordance with Section 351, State Specifications, except as herein modified.

The aggregate base course shall be constructed with aggregate conforming to Gradation CA-6.

If the aggregate used is a gravel material, it shall be one hundred (100) percent crushed gravel (Grade 9).

If the aggregate used is a stone, it shall be crushed stone and shall be angular fragments resulting from the crushing by mechanical means of calcareous or dolomitic limestone from undisturbed, consolidated deposits (Grade 8).

The Contractor shall notify the General Contractor at least sixty (60) days prior to start of construction of the source of material and shall provide samples of the base course material for approval.

Aggregate base course may be Type A or B as determined by the Engineer. Aggregate spreader box shall be used, except in those areas where the Engineer determines that use of the box is impractical.

4. BITUMINOUS CONCRETE BASE AND SURFACE COURSE

This work shall be processed according to Section 406, State Specifications, except as herein modified.

On all aggregate base course, an application of 0.35 gal./square yard of RC-70 prime coat will be required. On existing paved areas that are to be resurfaced, an application of 0.05 gal./square yard of RC-70 prime coat will be required after the pavement has been thoroughly clean swept of debris.

The Contractor shall prepare or obtain from the material supplier, a mix design and submit to the General Contractor sixty (60) days prior to construction for approval. The mix design shall be in accordance with the following parameters:

	<u>Binder</u>	<u>Surface</u>
Bitumen Content	4.5% to 5%	5.5% to 6.5%
Air Voids	3% to 5%	3% to 5%
Aggregate		
VMA	15% to 22%	15% to 20%
Voids Filled	65% to 75%	70% to 85%
Marshall Stability	2,000	2,000
Flow at 140 F, 0.01"	8% to 16%	8% to 16%

The mix design must be followed within allowable variation. Compaction of the material shall be ninety-five (95) percent of actual density base upon the material test methods.

Where laying the bituminous concrete surface course adjacent to a previously placed section, the edge of the previously placed section shall be heated to insure a thorough and continuous bond (hot joint) between the sections.

5. ORDER OF PAVING

Unless otherwise directed by the Engineer, the parking lots shall be paved in successive passes beginning at the ridge lines and pave to the low points.

6. TOLERANCE IN BASE COURSE THICKNESS

It is the intent that the base course shall be constructed to the nominal thickness shown on the plans. Thickness determinations shall be made at such points as the Engineer and Owner may select. When the constructed thickness is less than ninety (90) percent of the nominal thickness shown on the plans, bituminous concrete binder shall be added to obtain the required nominal thickness.

7. SIDEWALKS AND MEDIANS

This work shall be processed in accordance with Section 624, State Specifications, except as herein modified. Concrete for this work shall be six (6) percent air entrained. The concrete shall be placed on a granular cushion of fine aggregate of sand at least two (2) inches thick, or as specified on the plans.

8. PORTLAND CEMENT CONCRETE PAVEMENT

This work shall be performed in accordance with Sections 408 and 409, State Specifications, and according to the cross-sections and details in the plans.

The concrete pavement over the Rainstore is a critical installation with regards to the continuing operation of the site. The use of high-early strength concrete, Class RR, may be used in an effort to complete the construction.

All concrete shall used shall consist of the use of 100% Virgin Colated, fibrillated polypropylene fiber, Fibremesh, according to the manufacturers recommendations. This reinforcing methods is in addition to, and not a replacement for standard steel reinforcement.

9. MATERIAL TESTING

Attention is directed to the following provisions regarding the testing of materials, as may be required by the Engineer. Laboratory tests to be made by a testing laboratory employed by and paid for by the Contractor.

Test specimens and cores will be required by the Construction Engineer and shall be furnished by the Contractor at no extra expense to the General Contractor. A minimum of one test cores shall be taken in each area designated on the plans.

In addition, the Contractor shall provide the General Contractor with an affidavit signed by the Manufacturer and/or the Material Supplier certifying that all materials furnished to the Contractor for installation within the work conform to the requirements of the contract specifications.

10. SPECIFICATIONS

A copy of the State of Illinois, Department of Transportation, "Standard Specifications for Road and Bridge Construction" ("State Specifications"), current at date of the specifications, are on file in the office of Joseph A. Schudt & Associates, Design Engineer, and are available, therefore, for contract review. Specifications are also available on the internet at <http://www.dot.state.il.us/desenv/stdspecs.html>

11. PAYMENT

Payment for the work shall be on the basis of a Lump Sum Contract.

Riverdale Chemical Company
Chicago Heights, Illinois

Supporting Calculations

30-May-01

- Detention Basin (East)
- Detention Basin East – Stage-Storage
- East Basin Release Rate Calculations
- Detention Basin (West)
- Detention Basin Storage Calculations
- Corp Permit
- Terracon Addendum & Report
- JoMar Telegrouting Report
- Watershed Map



Matthew C. Anderson
5-31-01
EXP 11-30-01

JOSEPH A. SCHUDT & ASSOCIATES

PROJECT: RIVERDALE CHEMICAL-EAST JOB NO. 00-98

TITLE: PROPOSED DETENTION REQUIRED

Release Rate Calculation

Area 5.91 acres
 Undev. C 0.86
 Tc Undev. 30 min
 Storm 3 yr (TP40)
 Intensity 2.45 in/hr

Developed

Area 5.91
 Imp. A 5.61
 Imp % 0.95
 Imp C 0.90
 Perv. Area 0.38
 Perv. % 0.06
 Perv. C 0.45

(0.15*AREA*Intensity)

Release Rate 2.17 cfsComposite C 0.88**Basin Calculations Based on a 100 year Storm**

Duration (min)	Intensity (100yr, in/hr)	Inflow (cfs)	Stored Rate	Reservoir size (ac-ft)
10	10.71	55.96	53.79	0.75
20	7.73	40.39	38.22	1.06
30	6.29	32.86	30.69	1.28
40	5.14	26.86	24.68	1.37
50	4.46	23.30	21.13	1.47
60	4.00	20.90	18.73	1.56
90	2.98	15.57	13.40	1.67
120	2.46	12.85	10.68	1.78
180	1.61	8.41	6.24	1.56
240	1.44	7.52	5.35	1.78
300	1.21	6.32	4.15	1.73
360	1.06	5.54	3.37	1.68
420	0.94	4.91	2.74	1.60
480	0.83	4.34	2.16	1.44
540	0.76	3.97	1.80	1.35
600	0.71	3.71	1.54	1.28
660	0.66	3.45	1.28	1.17
720	0.62	3.24	1.07	1.07

(B70 RAINFALL)

Required Basin 1.78 acre-ft Denotes calculated answers

RIVERDALE CHEMICAL
EAST POND
24" RCP OUTLET TO NORTH
6" RESTRICTOR

#Units=Elevation,ft,Area,ft2,Volume,acft,Volume,acft

#	Elev	Area	Conic Vol	Cumml Conic
#	ft	ft2	acft	acft
	662.75	33249.40	0.5436	1.8836
	662.00	29947.20	0.1461	1.3400
	661.75	21242.40	0.3168	1.1939
	661.00	15709.83	0.3296	0.8771
	660.00	13059.64	0.2354	0.5475
	659.00	7692.67	0.1579	0.3121
	658.00	6102.50	0.1230	0.1542
	657.00	4654.51	0.0312	0.0312
	656.50	1164.78	0.0000	0.0000

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Rain Dir: C:\HAESTAD7\PPKW\RAINFALL\

00.98

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JOB TITLE

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Riverdale Chemical - East Pond
Release Rate Elevation Calculations
6" Projecting Orifice

Type.... Chn-Circular
Name.... OUTLET 10

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Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

CIRCULAR CROSS SECTION

Slope = .001568 ft/ft
Mannings n = 0.01300
Invert Elev. = 654.99 ft
Top of Channel = 656.99 ft
Diameter = 2.0000 ft

Elev. (ft)	Depth (ft)	Flow (cfs)	Vel. (ft/sec)	Area (sq.ft)	Top W. (ft)	Wet.P. (ft)	Hd (ft)	Froude No.
654.990	.00	.00	.00	.0000	.00	.00	.00	0.00
655.030	.04	.01	.40	.0150	.56	.57	.03	0.43
655.070	.08	.03	.63	.0422	.78	.81	.05	0.48
655.110	.12	.06	.82	.0770	.95	.99	.08	0.51
655.150	.16	.12	.99	.1177	1.09	1.15	.11	0.53
655.190	.20	.19	1.14	.1635	1.20	1.29	.14	0.55
655.230	.24	.27	1.28	.2135	1.30	1.41	.16	0.56
655.270	.28	.38	1.41	.2674	1.39	1.53	.19	0.57
655.310	.32	.50	1.53	.3245	1.47	1.65	.22	0.57
655.350	.36	.63	1.65	.3845	1.54	1.75	.25	0.58
655.390	.40	.78	1.75	.4473	1.60	1.85	.28	0.58
655.430	.44	.95	1.86	.5125	1.66	1.95	.31	0.59
655.470	.48	1.13	1.95	.5797	1.71	2.05	.34	0.59
655.510	.52	1.33	2.04	.6491	1.75	2.14	.37	0.59
655.550	.56	1.53	2.13	.7201	1.80	2.23	.40	0.59
655.590	.60	1.75	2.21	.7926	1.83	2.32	.43	0.59
655.630	.64	1.99	2.29	.8667	1.87	2.41	.46	0.59
655.670	.68	2.23	2.37	.9419	1.89	2.49	.50	0.59
655.710	.72	2.48	2.44	1.0181	1.92	2.57	.53	0.59
655.750	.76	2.75	2.51	1.0955	1.94	2.66	.56	0.59
655.790	.80	3.02	2.57	1.1735	1.96	2.74	.60	0.59
655.830	.84	3.30	2.63	1.2522	1.97	2.82	.63	0.58
655.870	.88	3.59	2.69	1.3314	1.99	2.90	.67	0.58
655.910	.92	3.88	2.75	1.4109	1.99	2.98	.71	0.58
655.950	.96	4.18	2.80	1.4909	2.00	3.06	.75	0.57
655.990	1.00	4.48	2.85	1.5708	2.00	3.14	.79	0.57
656.030	1.04	4.78	2.90	1.6507	2.00	3.22	.83	0.56
656.070	1.08	5.09	2.94	1.7307	1.99	3.30	.87	0.56
656.110	1.12	5.40	2.98	1.8102	1.99	3.38	.91	0.55
656.150	1.16	5.71	3.02	1.8894	1.97	3.46	.96	0.54
656.190	1.20	6.02	3.06	1.9681	1.96	3.54	1.00	0.54
656.230	1.24	6.32	3.09	2.0461	1.94	3.63	1.05	0.53
656.270	1.28	6.63	3.12	2.1234	1.92	3.71	1.11	0.52
656.310	1.32	6.92	3.15	2.1997	1.89	3.79	1.16	0.52
656.350	1.36	7.22	3.17	2.2749	1.87	3.88	1.22	0.51
656.390	1.40	7.50	3.19	2.3490	1.83	3.96	1.28	0.50
656.430	1.44	7.78	3.21	2.4215	1.80	4.05	1.35	0.49

SOLUTION TO MANNINGS OPEN CHANNEL FLOW EQUATION
(Computed values are based on normal depth.)

$$Q = (k/n) \cdot A \cdot (R^{2/3}) \cdot (S^{1/2})$$

where:	English Units	SI units
Q = Channel flow	cfs	cms
k = Mannings constant	1.485919	1.0
n = Mannings n	no units	no units
R = Hydraulic radius, A/WP	ft	m
A = X-section flow area	sq.ft.	sq.m.
WP = Wetted perimeter	ft	m
S = Slope	ft/ft	m/m

ADDITIONAL OUTPUT VARIABLES:

$$Vel = Q/A$$

$$Hd = A/TpW$$

$$F = Vel / (g \cdot Hd)^{1/2}$$

where:	English Units	SI units
Vel= Velocity	ft/sec	m/sec
Q = Channel flow	cfs	cms
A = X-section flow area	sq.ft.	sq.m.
Hd = Hydraulic depth	ft	m
TpW= Top width for flow area	ft	m
g = Acceleration of gravity	ft/sec**2	m/sec**2
F = Froude No.	no units	no units
(Subcritical: F < 1; Critical: F = 1; Supercritical: F > 1)		

Type.... Outlet Input Data
Name.... OUTLET 10

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OUTLET STRUCTURE INPUT DATA

Structure ID = 1
Structure Type = Orifice-Circular

of Openings = 1
Invert Elev. = 655.10 ft
Diameter = .5000 ft
Orifice Coeff. = .500

Structure ID = TW
Structure Type = TW SETUP, DS Channel

USE DOWNSTREAM CHANNEL NORMAL DEPTH FOR TW...
Channel Type: Chn-Circular
Channel ID: OUTLET 10

CONVERGENCE TOLERANCES...
Maximum Iterations= 30
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .10 cfs
Max. Q tolerance = .10 cfs

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RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 1 (Orifice-Circular)
Upstream ID = (Pond Water Surface)
DNstream ID = TW (Pond Outfall)

WS Elev, Device Q		Tail Water		Notes
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages
655.10	.00	654.99	.000	Upstream HW & DNstream TW < Inv.El
655.20	.02	655.11	.000	CRIT.DEPth CONTROL Vh= .022ft Dcr= .078ft CRIT.DEPth
655.30	.09	655.11	.000	CRIT.DEPth CONTROL Vh= .052ft Dcr= .148ft CRIT.DEPth
655.40	.19	655.22	.000	CRIT.DEPth CONTROL Vh= .082ft Dcr= .219ft CRIT.DEPth
655.50	.31	655.22	.000	CRIT.DEPth CONTROL Vh= .116ft Dcr= .283ft CRIT.DEPth
655.60	.39	655.28	.000	H =.25
655.70	.47	655.28	.000	H =.35
655.80	.53	655.34	.000	H =.45
655.90	.58	655.34	.000	H =.55
656.00	.63	655.34	.000	H =.65
656.10	.68	655.34	.000	H =.75
656.20	.72	655.37	.000	H =.83
656.30	.75	655.40	.000	H =.90
656.40	.79	655.40	.000	H =1.00
656.50	.83	655.40	.000	H =1.10
656.60	.86	655.40	.000	H =1.20
656.70	.90	655.40	.000	H =1.30
656.80	.92	655.43	.029	H =1.37
656.90	.95	655.43	.000	H =1.47
657.00	.98	655.46	.029	H =1.54
657.10	1.01	655.46	.000	H =1.64
657.20	1.04	655.46	.000	H =1.74
657.30	1.07	655.46	.000	H =1.84
657.40	1.10	655.46	.000	H =1.94
657.50	1.13	655.46	.000	H =2.04
657.60	1.15	655.46	.000	H =2.14
657.70	1.18	655.46	.000	H =2.24
657.80	1.20	655.49	.000	H =2.31
657.90	1.22	655.49	.000	H =2.41
658.00	1.25	655.49	.000	H =2.51
658.10	1.27	655.52	.000	H =2.58
658.20	1.29	655.52	.000	H =2.68
658.30	1.31	655.52	.000	H =2.78
658.40	1.34	655.52	.000	H =2.88

Type.... Individual Outlet Curves
Name.... OUTLET 10

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RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)

DNstream ID = TW (Pond Outfall)

WS Elev,Device Q		Tail Water		Notes	
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages	
661.90	1.97	655.64	.000	H =6.26	
662.00	1.99	655.64	.000	H =6.36	
662.10	2.00	655.64	.000	H =6.46	
662.20	2.02	655.64	.000	H =6.56	
662.30	2.03	655.64	.000	H =6.66	
662.40	2.05	655.64	.000	H =6.76	
662.50	2.06	655.64	.000	H =6.86	
662.60	2.08	655.64	.000	H =6.96	
662.70	2.09	655.64	.000	H =7.06	
662.75	2.10	655.64	.000	H =7.11	

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***** COMPOSITE OUTFLOW SUMMARY *****

CUMULATIVE HGL CONVERGENCE ERROR .029 (+/- ft)
FLOW PATH: Elev= 660.7; Branch: 1-TW

* Max. convergence errors shown may also occur for
flow paths other than the ones listed above.

WS Elev. Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
658.50	1.36	655.52	.000	1
658.60	1.38	655.52	.000	1
658.70	1.40	655.52	.000	1
658.80	1.43	655.52	.000	1
658.90	1.45	655.52	.000	1
659.00	1.46	655.55	.029	1
659.10	1.48	655.55	.000	1
659.20	1.51	655.55	.000	1
659.30	1.53	655.55	.000	1
659.40	1.55	655.55	.000	1
659.50	1.57	655.55	.000	1
659.60	1.58	655.58	.000	1
659.70	1.60	655.58	.000	1
659.80	1.62	655.58	.000	1
659.90	1.64	655.58	.000	1
660.00	1.66	655.58	.000	1
660.10	1.67	655.58	.000	1
660.20	1.69	655.58	.000	1
660.30	1.71	655.58	.000	1
660.40	1.73	655.58	.000	1
660.50	1.75	655.58	.000	1
660.60	1.77	655.58	.000	1
660.70	1.78	655.61	.029	1
660.80	1.79	655.61	.000	1
660.90	1.81	655.61	.000	1
661.00	1.83	655.61	.000	1
661.10	1.85	655.61	.000	1
661.20	1.86	655.61	.000	1
661.30	1.88	655.61	.000	1
661.40	1.90	655.61	.000	1
661.50	1.91	655.61	.000	1
661.60	1.92	655.64	.000	1
661.70	1.94	655.64	.000	1
661.80	1.96	655.64	.000	1

Index of Starting Page Numbers for ID Names

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OUTLET 10... 1.01. 1.03, 2.01,
2.04, 2.07

JOSEPH A. SCHUDT & ASSOCIATES

PROJECT: RIVERDALE CHEMICAL-WEST **JOB NO.** 00-98
TITLE: PROPOSED DETENTION REQUIRED

Release Rate Calculation

Area 2.48 acres
 Undev. C 0.86
 Tc Undev. 10 min
 Storm 3 yr (TP40)
 Intensity 4.3 in/hr

Developed

Area 2.48
 Imp. A 2.48
 Imp % 1.00
 Imp C 0.90
 Perv. Area 0.00
 Perv. % 0.00
 Perv. C 0.45

$$(0.15 \cdot \text{AREA} \cdot \text{Intensity})$$

Release Rate 1.60 cfs

Composite C 0.90

Basin Calculations Based on a 100 year Storm				
Duration (min)	Intensity (100yr, in/hr)	Inflow (cfs)	Stored Rate	Reservoir size (ac-ft)
10	7.6	16.94	15.34	0.21
20	5.5	12.26	10.66	0.30
30	4.4	9.81	8.21	0.34
40	3.7	8.25	6.65	0.37
50	3.2	7.13	5.53	0.38
60	2.8	6.24	4.64	0.39
90	2.1	4.68	3.08	0.39
120	1.7	3.79	2.19	0.37
180	1.2	2.67	1.08	0.27
240	1	2.23	0.63	0.21
300	0.84	1.87	0.27	0.11
360	0.73	1.63	0.03	0.01
420	0.65	1.45	-0.15	-0.09
480	0.58	1.29	-0.30	-0.20
540	0.53	1.18	-0.42	-0.31
600	0.49	1.09	-0.51	-0.42
660	0.46	1.03	-0.57	-0.52
720	0.43	0.96	-0.64	-0.64

(B70 RAINFALL)

Required Basin 0.39 acre-ft

Denotes calculated answers

JOSEPH A. SCHUDT & ASSOCIATES

PROJECT: RIVERDALE CHEMICAL-WEST **JOB NO.** 00-98
TITLE: PROPOSED UNDERGROUND DETENTION REQUIRED

VOLUME REQ'D	0.39 acre-ft	CONVERSIONS
	16854.8 cubic ft	1m = 3.2808 ft
	477.3 cubic meters	

RAINSTORE VOID 94%

ACTUAL RAINSTORE

VOL NEEDED	508 cubic meters
say	510 cubic meters

LOWEST POINT	664.3 ft	
CONC. TOP	0.83 ft	
STONE BASE	1 ft	0.56
TOP OF STORAG	662.47 ft	
INVERT	658.3 ft	4.17 ft
DEPTH	1.20 m	1.27 m

WIDTH	25.0 m	82.04 ft
length	17.0 m	55.90 ft
VOL PROVIDED	511.28	

CA6 BASE	713.0497 m3	6" CA6 BASE - 95% COMPACT
GEOTEXTILE	1,000.69 m2	
EXVACATION	1,012.72 m3	1,324.64 CY

REFLECTS
ATTENTION OFDEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO, ILLINOIS 60606-7205

APR 24 2001

Construction-Operations Division
Regulatory Branch
200100604SUBJECT: Proposed Excavation of an Existing Storm Water
Detention Pond Located in the Southeast Corner of the Project
Site at Riverdale Chemical in the City of Chicago Heights, Cook
County, IllinoisRiverdale Chemical Company
Attention: Mr. Tom Siljkovic
220 East 17th Street
Chicago Heights, Illinois 60411

Dear Mr. Siljkovic:

This is in response to your request that the U.S. Army Corps of Engineers complete a authorization for the above-referenced site. The subject project has been assigned number 200100604. Please reference this number in all future correspondence concerning this project.

The U.S. Army Corps of Engineers has determined that the subject property contains "Waters of the United States", including wetlands, under its jurisdiction. Pursuant to Section 404 of the Clean Water Act, this office regulates the discharge of dredged or fill material into waters of the United States. A Department of the Army (DA) permit is required for any work involving such a discharge. However, based on the information you furnished, your project does not appear to entail a discharge into an area within the jurisdiction of this office. Therefore, a DA permit is not required for your work.

This determination covers only your project as depicted in the Preliminary Engineering Plans dated December 12, 2000 (revised January 4, 2001), prepared by Joseph A. Schudt & Associates. Measures should be taken to prevent construction materials and/or activities from entering any waters of the United States. Appropriate soil erosion and sediment controls should be implemented on-site to achieve this end. This determination is valid for 5 years from the date of this letter.

Terracon135 Ambassador Drive
Naperville, IL 60540
(630) 717-4263
Fax (630) 357-9160

May 25, 2001

Mr. Matt Anderson, P.E.
Joseph A. Schudt & Associates
19350 South Harlem Avenue
Frankfort, Illinois 60423**Re: Addendum to Geotechnical Engineering Report
Proposed Truck Parking Area
Riverdale Chemical Co. - Chicago Heights, Illinois
Terracon Project No. 56015003**

Dear Mr. Anderson:

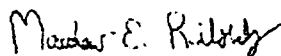
As we have discussed on the telephone, MatCon is no longer being considered for use as a pavement material at the above referenced project. Therefore, you have requested that our recommended pavement section be revised to account for standard bituminous concrete products, instead of MatCon.

In our original report, we recommended a pavement section of 4 inches of MatCon, underlain by 10 inches of IDOT Gradation CA-6 base course. This pavement section was based on estimated traffic counts provided by JAS Associates. We understand that the estimated traffic counts are still applicable. Based on this information, we recommend the following pavement section is used in design of pavements at the above referenced project.

2" Class I Bituminous Surface Course
3" Class I Bituminous Binder Course
10" IDOT Gradation CA-6 Base Course

The subgrade preparation and compacted fill requirements outlined in our original geotechnical report should be followed to provide a suitable subgrade for paving.

We appreciate the opportunity to assist you on this project. Please call if there are any questions or if we may be of further service.

Respectfully submitted,
TERRACON, INC.Matthew E. Ribordy, P.E.
Senior Project Engineer



8427 Enterprise Drive
Mokena, Illinois 60448
(708) 478-8883 Fax: (708) 478-9867

February 12, 2001

Mr. Matt Anderson, P.E.
Joseph A. Schudt & Associates
19350 South Harlem Avenue
Frankfort, Illinois 60423

**Re: Geotechnical Engineering Report
Proposed Truck Parking Area
Riverdale Chemical Co. - Chicago Heights, Illinois
Terracon Project No. 56015003**

Dear Mr. Anderson:

In response to your authorization of Terracon Proposal No. P000778 dated December 22, 2000; we have completed the subsurface exploration and geotechnical engineering services for the proposed project.

The purpose of this subsurface exploration program was to develop site specific information regarding the character of the soils upon which this construction is to be supported and provide recommendations regarding site preparation and the design of pavements for the proposed project.

Project Description

We understand the proposed project will include constructing new pavements to handle truck and automobile traffic at Riverdale Chemical Company. The traffic loading will be equivalent to approximately 30 fully loaded semi tractor-trailers per day, with traffic increasing over time. Due to environmental concerns at the site, a proprietary material known as MatCon (Modified Asphalt Technology for Waste Containment) will be used to pave the site. MatCon is an advanced binder material that, when mixed with aggregate, provides a relatively impermeable (less than 1×10^{-8} cm/sec), durable surface that can support operation of heavy equipment directly on its surface.

Currently, the areas proposed for paving are covered with various amounts of crushed stone, gravel and asphalt grindings. We understand the subgrade soils in these areas are contaminated and cannot be removed from the site. Therefore, grading on the site will generally be limited to placing about 1 to 2 feet of new fill to achieve design grades.

Field Testing

The site subsurface conditions were explored with six soil test borings, each drilled to a depth of about 5 feet below site grade. Joseph A. Schudt & Associates (JAS) selected the

Arizona ■ Arkansas ■ Colorado ■ Georgia ■ Idaho ■ Illinois ■ Iowa ■ Kansas ■ Kentucky ■ Minnesota ■ Missouri ■ Montana
Nebraska ■ Nevada ■ New Mexico ■ Oklahoma ■ Tennessee ■ Texas ■ Utah ■ Wisconsin ■ Wyoming

Quality Engineering Since 1965

**Proposed Truck Pavements
Riverdale Chemical Co. - Chicago Heights, Illinois
Terracon No. 56015003
February 12, 2001**

Terracon

boring locations and depths. JAS also staked the boring locations in the field and established the elevations of the borings. The approximate locations of the borings are shown on the attached Boring Location Diagram.

The borings were drilled with a truck-mounted drilling rig using continuous flight solid-stemmed augers to advance the borehole. Representative samples were obtained using thin-walled tube sampling procedures in general accordance with ASTM D-1587. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge is pushed hydraulically into the ground to obtain relatively undisturbed samples of cohesive or moderately cohesive soils. The samples were sealed and returned to the laboratory for testing and classification.

The drill crew prepared a field log of each boring. These logs included visual classifications of the materials encountered during drilling as well as the drill crew's interpretation of the subsurface conditions between samples. The final boring logs included with this report represent an interpretation of the field logs and include modifications based on laboratory observation and tests of the samples.

Laboratory Testing

All samples were tested in the laboratory to measure their natural water contents. Selected thin-walled tube samples were tested for dry unit weight. The approximate unconfined compressive strengths of the cohesive samples were measured by a calibrated penetrometer. The test results are provided on the boring logs. Additionally, a moisture-density relation test in general accordance with ASTM D 698 was performed on a composite bulk sample of the surface crushed stone to determine the maximum dry density and optimum moisture content.

As part of the testing program, the samples were examined in the laboratory and classified in accordance with the attached General Notes and the Unified Soil Classification System based on the material's texture and plasticity. The estimated group symbols for the Unified Soil Classification System are shown on the boring logs.

Soil Conditions

Conditions encountered at the boring locations are indicated on the individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types, whereas, in-situ, the transition between materials may be gradual. Based on the results of the borings, subsurface conditions can be described as follows.

Approximately 4 to 36 inches of crushed stone, gravel or asphalt grindings were encountered at the ground surface in all the borings. At Borings 101 through 105, very stiff to hard consistency lean clay was sampled below the upper stone materials and extended

Proposed Truck Pavements
Riverdale Chemical Co. - Chicago Heights, Illinois
Terracon No. 58015003
February 12, 2001

to the boring termination depth of about 5 feet. At Boring 106, soft lean clay with organics (topsoil) was encountered below the crushed stone and extended to a depth of about 3 feet. Stiff lean clay was encountered below the organic clay and extended to the boring termination depth of about 5 feet.

Please refer to the attached boring log for the laboratory data and a more detailed description of the subsurface conditions encountered at the individual boring locations.

Groundwater Conditions

The borings were monitored while drilling and after completion for the presence and level of groundwater. At these times, groundwater was not observed within the boreholes.

Fluctuations of groundwater levels may occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

EVALUATION AND RECOMMENDATIONS

Geotechnical Discussion

Based on the boring information, it appears the majority of the site contains subgrade materials that are suitable for support of new pavement. However, at Boring 106, about 2 feet of soft lean clay soil was sampled below the crushed stone surface materials. We understand that a wetland area is located near the southeast portion of the site and therefore, soft clay soils could be encountered at other locations. For this reason, we recommend that the proposed subgrade be thoroughly evaluated by proofrolling at the time of construction. Based on discussions with Mr. Carl Yost of Wilder Construction, who is the patent holder of MatCon, it is extremely important to provide an unyielding subgrade prior to the placement of MatCon pavement. Therefore, if soft, yielding areas are observed during proofrolling, additional crushed stone and possibly the use of geogrid reinforcement will be required to provide a stable, unyielding subgrade.

Detailed recommendations regarding subgrade preparation and pavement design are provided in the following sections of this report.

Subgrade Preparation and Compacted Fill Requirements

Prior to placement of site fill or new pavement materials, the exposed subgrade should be proofrolled. Proofrolling aids in providing a firm base for compaction of new fill by delineating soft or disturbed areas that may exist at or near the exposed subgrade level. Proofrolling is extremely important to help evaluate the surface stability of the

**Proposed Truck Pavements
Riverdale Chemical Co. - Chicago Heights, Illinois
Terracon No. 56015003
February 12, 2001**

organic clay soils, which underlie the crushed stone in the vicinity of Boring 6. Proofrolling should be accomplished with a fully loaded, tandem-axle dump truck or other equipment providing an equivalent subgrade loading. A minimum gross weight of 25 tons is recommended for the proofrolling equipment. Proofrolling should be performed in the presence of a Terracon representative in order to aid in evaluating unstable subgrade areas.

Normally, if soft, yielding soils are encountered during proofrolling, they are undercut and replaced with new fill. However, at this site, we understand that soils cannot be undercut and removed due to environmental concerns. Therefore, if yielding is observed during proofrolling, it will be necessary to "bridge" the area by adding additional stone directly on top of the existing subgrade. Additionally, depending upon the severity of the yielding, it may be necessary to also incorporate geogrid reinforcement. The most appropriate type of subgrade stabilization will need to be evaluated at the time of construction.

Some nuclear density tests were performed on the existing stone surface materials, to try and determine their percent compaction. The results of the tests were quite variable, which probably means a combination of variable in-place compaction, as well as variable gradations and maximum dry densities of the surface stone. Therefore, in addition to proofrolling, we recommend the exposed subgrade be compacted with about 3 to 4 passes of a minimum 10-ton vibratory roller to help insure proper compaction of the existing stone materials.

New fill placed in the parking area should consist of well-graded, granular material meeting IDOT CA-6 gradation requirements. The new fill should be placed and compacted in lifts of 8 inches or less in loose thickness and should be compacted within the range of 2 percentage points below to 2 percentage points above the optimum moisture content value. Fill should be compacted to at least 98% of the material's maximum dry density (ASTM D-698). Pavement areas that will receive less than 12 inches of new fill, should be scarified to a depth of about 9 inches, moisture conditioned, and recompacted as recommended above. This will help form a more uniform subgrade for support of pavements. We should note that these criteria are somewhat more restrictive than may be common for a flexible pavement section, but in our opinion are warranted to provide a uniformly unyielding base on which to construct the MatCon pavement. All new fill placement and compaction should be observed and tested by Terracon personnel.

Pavement Recommendations

Preparation of the pavement subgrade should be in accordance with the recommendations outlined in the previous section of this report.

Proposed Truck Pavements
Riverdale Chemical Co. - Chicago Heights, Illinois
Terracon No. 56015003
February 12, 2001

The recommended pavement sections have been selected in general accordance with the AASHTO (1986) design method. Briefly, the design method takes into consideration the structural design traffic, the subgrade support value and the structural layer coefficients of each component of the pavement system.

The pavement thickness design was based on an initial traffic volume of about 30 semi-trucks per day and the results of our exploration and testing. The traffic volume was assumed to increase about 3 percent a year, over the 20-year design period. The following are the pavement design parameters and assumptions used for evaluating pavement thicknesses.

- IBR value of subgrades prepared as recommended: 5
- Initial serviceability: 4.2
- Terminal serviceability: 2.0
- Reliability: 85 percent
- Standard deviation: 0.45
- Design flexible E - 18s for heavy duty asphalt pavements: 705,000
- Design life: 20 years
- Structural coefficient for MatCon pavement: 0.44
- Structural coefficient for IDOT CA-6 granular subbase: 0.13
- Semi-tractor trailer assumes HS 20 truck loading of: 12kip-34kip-34kip axle loads.

Presented below is the recommended minimum pavement design thickness for the requested traffic loads. Based on discussions with Wilder Construction, we understand that the use of more than four inches of MatCon pavement is typically not required, nor is it economical.

RECOMMENDED PAVEMENT SECTION

20-year Pavement Section

4 inches MatCon Pavement, over
10 inches Type B Granular Subbase (IDOT Gradation CA-6)

The mixing and placement of the MatCon pavement should be performed in accordance with recommendations and specifications provided by Wilder Construction.

Proposed Truck Pavements
Riverdale Chemical Co. - Chicago Heights, Illinois
Terracon No. 56015003
February 12, 2001

Terracon

General Comments

Terracon, Inc. should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. In the event Terracon is not retained to perform this recommended review, we will assume no responsibility for misinterpretation of our recommendations.

Terracon also should be retained to provide testing and observation during excavation, grading and construction phases of the project. The purpose of these services would be to provide Terracon the opportunity to observe the soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur across the site. The nature and extent of such variations may not become evident until construction. If variations appear, it will be necessary to reevaluate the recommendations of this report.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made.

We appreciate the opportunity to assist you on this project. Please call if there are any questions or if we may be of further service.

Respectfully submitted,
TERRACON, INC.

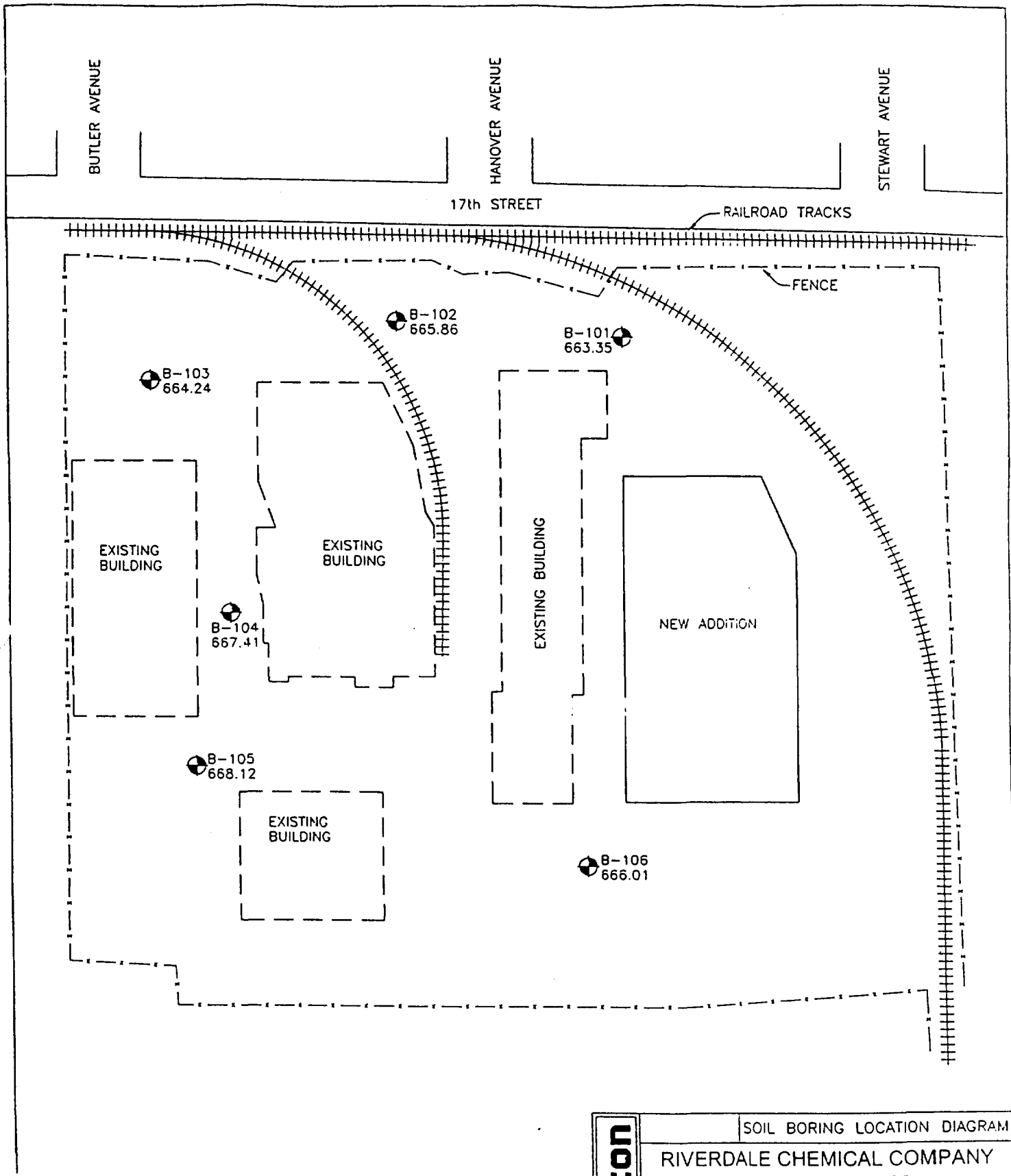
Matthew E. Ribordy
Matthew E. Ribordy, P.E.
Illinois No. 062-052126




Stephen A. Bucher
Stephen A. Bucher, P.E.
Illinois No. 062-040512

Copies to: Addressee (3)

Attachments



LEGEND


 - Approximate Location and Elevation of Boring

Terracon

SOIL BORING LOCATION DIAGRAM

RIVERDALE CHEMICAL COMPANY
PAVEMENT BORINGS

17th ST & HANOVER AVE
CHICAGO HEIGHTS, ILLINOIS

DRAWING NOT TO SCALE

PROJECT #	FILE NAME	DATE	BY
56015003	5003SBLD	2/9/01	T.P.

Page 1 of 1



BORE1 56015003 GPJ TERRACON GDT 2/8/01

•140 Lbs Automatic SPT Hammer
•Calibrated Hand Penetrometer

Terracon

LOG OF BORING NO. 102

Page 1 of 1

CLIENT Joseph A. Schudt & Associates				OWNER Riverdale Chemical Company						
SITE 220 East 17th Street Chicago Heights, Illinois				PROJECT Riverdale Chemical Truck Pavement						
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS			
				NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 665.9 ft									
	0.3 4" Crushed Stone	665.5		PA						
	<u>LEAN CLAY, TRACE SAND AND GRAVEL</u> , brown and gray, hard		CL	1	ST	17		17	112	9000+*
			CL	2	ST	8		16	113	9000+*
	5	661								
	BOTTOM OF BORING									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**140 Lbs Automatic SPT Hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft



WL	±	DRY	WD	±	DRY	AB
WL	±			±		
WL						

Terracon

BORING STARTED	1-23-01
BORING COMPLETED	1-23-01
RIG	34
FOREMAN	OM
APPROVED	MER
JOB #	56015003

LOG OF BORING NO. 103

Page 1 of 1

CLIENT			OWNER									
Joseph A. Schudt & Associates			Riverdale Chemical Company									
SITE			PROJECT									
220 East 17th Street Chicago Heights, Illinois			Riverdale Chemical Truck Pavement									
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS				
				NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf		
	Approx. Surface Elev.: 664.2 ft											
	0.5 6" Crushed Stone <u>3/4" GRAVEL (IDOT CA-7)</u>	663.5			PA							
	3 <u>LEAN CLAY, TRACE SAND AND GRAVEL</u> , brown and gray, hard	661	CL	1	ST	6		19	112	9000*		
	5 BOTTOM OF BORING	659										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**140 Lbs Automatic SPT Hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft

WL	± DRY	WD	± DRY	AB
WL	±		±	
WL				

Terracon

BORING STARTED		1-23-01	
BORING COMPLETED		1-23-01	
RIG	34	FOREMAN	OM
APPROVED	MER	JOB #	56015003

BORE1 56015003 G.P. TERRACON GDT 2/8/01

Page 1 of 1

Joseph A. Schudt & Associates

Riverdale Chemical Company

220 East 17th Street
Chicago Heights, Illinois

Riverdale Chemical Truck Pavement

BORE1 56015003 GPJ TERRACON GDT 2/A/01

****140 Lbs Automatic SPT Hammer**
***Calibrated Hand Penetrometer**

Terracon

LOG OF BORING NO. 105

Page 1 of 1

CLIENT Joseph A. Schudt & Associates		OWNER Riverdale Chemical Company	
SITE 220 East 17th Street Chicago Heights, Illinois		PROJECT Riverdale Chemical Truck Pavement	

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS			
				NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 668.1 ft									
	12" Crushed Stone			PA						
	LEAN CLAY, TRACE SAND AND GRAVEL , brown and gray, hard	667	CL	1	ST	9		18	111	9000+*
			CL	2	ST	18		18	112	9000+*
5	663	5								
BOTTOM OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**140 Lbs Automatic SPT Hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft			
WL	☐ DRY	WD	☐ DRY AB
WL	☐	☐	
WL			

Terracon

BORING STARTED	1-23-01
BORING COMPLETED	1-23-01
RIG	34 FOREMAN OM
APPROVED MER	JOB # 56015003

BORE 1 56015003 G.P.I. L.A. CON. CDT. 2/8/01

LOG OF BORING NO. 106

Page 1 of 1

CLIENT Joseph A. Schudt & Associates					OWNER Riverdale Chemical Company				
SITE 220 East 17th Street Chicago Heights, Illinois					PROJECT Riverdale Chemical Truck Pavement				
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS		
				NUMBER	TYPE	RECOVERY, in.	SPT - N ** BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf
	Approx. Surface Elev.: 666.0 ft								
	12" Crushed Stone				PA				
		665							
	<u>LEAN CLAY, WITH ORGANICS</u> <u>(TOPSOIL)</u> , dark brown and black, soft, moist			CL/OL 1	ST	9		44	75
									1000*
									370
		663							
	<u>LEAN CLAY, TRACE SAND</u> , brown and dark gray, stiff, moist			CL	2	ST	14	27	96
									4000*
		661.5							
	<u>LEAN CLAY, TRACE SAND AND GRAVEL</u> , brown and gray								
		661							
	BOTTOM OF BORING								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**140 Lbs Automatic SPT Hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft				
WL	±	DRY	WD	±
WL	±		WD	±
WL				

Terracon

BORING STARTED	1-23-01
BORING COMPLETED	1-23-01
RIG	34
FOREMAN	OM
APPROVED	MER
JOB #	56015003

JACON GDT 2/8/01

BUREAU 56015003 GP



Laboratory Compaction Characteristics of Soil

135 Ambassador Drive
Naperville, Illinois 60540
(630) 717-4263

Client Name: JOSEPH A. SCHUDT & ASSOCIATES
Project Name: RIVERDALE CHEMICAL TRUCK PAVEMENT
Location: RIVERDALE CHEMICAL COMPANY
220 EAST 17TH STREET
CHICAGO HEIGHTS, ILLINOIS
Source Material: ON SITE
Sample Description: GRAY CRUSHED LIMESTONE

Material Designation: A Sample date: 1/23/01
Natural Moisture, %: 4.3

Project No.: 55015003 Date: 2/8/01

TEST RESULTS

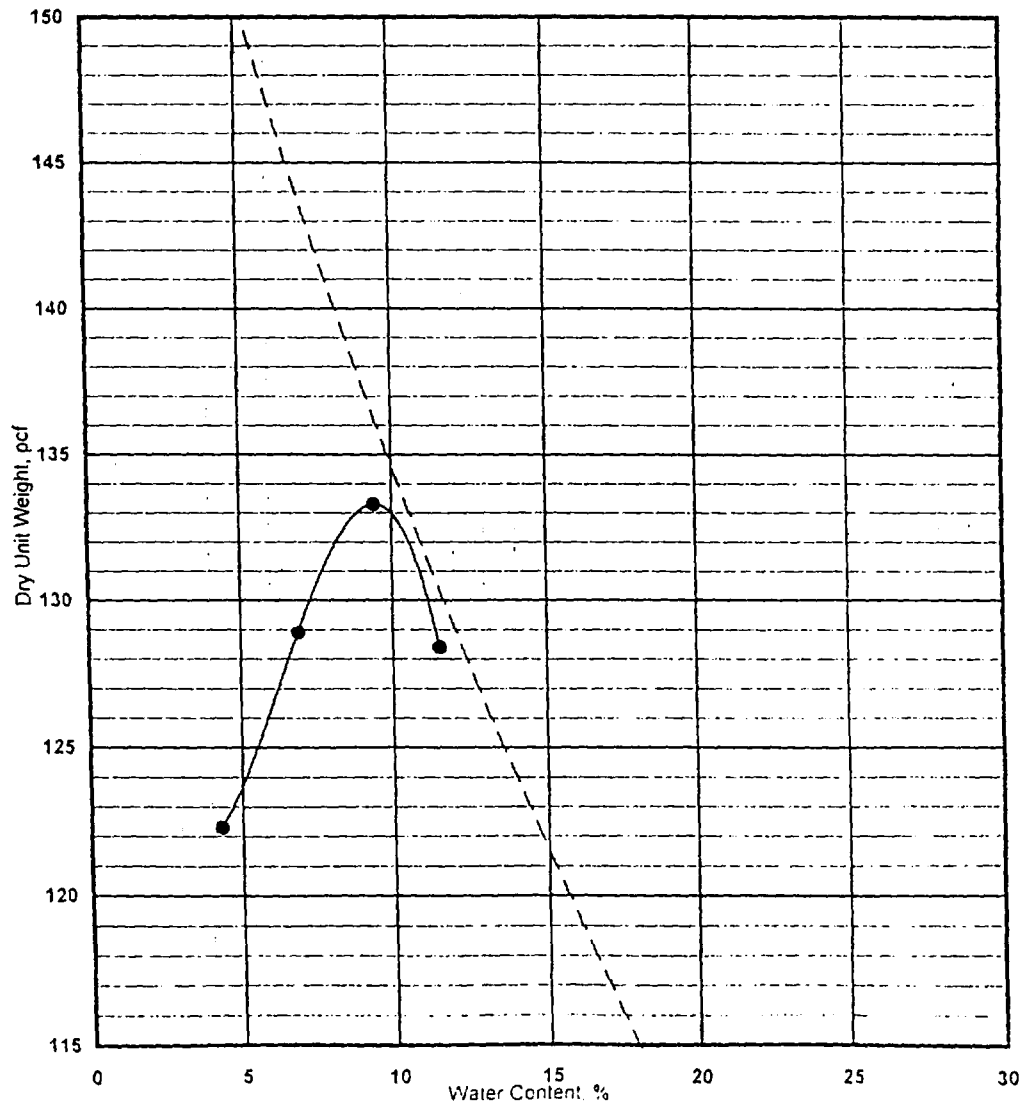
Maximum Dry Unit Wt.: 133.5 pcf
Optimum Water Content: 9.5 %

Test Method: ASTM D-698 (STANDARD)

Test Procedure: Method: C

Reviewed by: MER

Zero air voids for specific gravity of 2.75



GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS : Split Spoon - 1½" I.D., 2" O.D., unless otherwise noted	PS : Piston Sample
ST : Thin-Walled Tube - 2" O.D., Unless otherwise noted	WS : Wash Sample
PA : Power Auger	FT : Fish Tail Bit
HA : Hand Auger	RB : Rock Bit
DB : Diamond Bit - 4", N, B	BS : Bulk Sample
AS : Auger Sample	PM : Pressuremeter
HS : Hollow Stem Auger	DC : Dutch Cone
	WB : Wash Bore

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch OD split spoon, except where noted.

WATER LEVEL MEASUREMENT SYMBOLS:

WL : Water Level	WS : While Sampling
WCI : Wet Cave In	WD : While Drilling
DCI : Dry Cave In	BCR : Before Casing Removal
AB : After Boring	ACR : After Casing Removal

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of ground water levels is not possible with only short term observations.

DESCRIPTIVE SOIL CLASSIFICATION:

Soil Classification is based on the Unified Soil Classification System and ASTM Designations D-2487 and D-2488. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are described as: clays, if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse grained soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their consistency. Example: Lean clay with sand, trace gravel, stiff (CL); silty sand, trace gravel, medium dense (SM).

CONSISTENCY OF FINE-GRAINED SOILS:

Unconfined Compressive Strength, Qu, psf	Consistency
< 500	Very Soft
500 - 1,000	Soft
1,001 - 2,000	Medium
2,001 - 4,000	Stiff
4,001 - 8,000	Very Stiff
8,001 - 16,000	Hard
> 16,000	Very Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS:

N-Blows/ft.	Relative Density
0-3	Very Loose
4-9	Loose
10-29	Medium Dense
30-49	Dense
50-80	Very Dense
80+	Extremely Dense

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) (of Components Also Present in Sample)	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) (of Components Also Present in Sample)	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

GRAIN SIZE TERMINOLOGY

Major Component Of Sample	Size Range
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 sieve (0.075mm)

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests^A

Soil Classification

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Group Symbol	Group Name ^B	
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$	GW	Well-graded gravel ^F	
			$Cu < 4$ and/or $1 > Cc > 3^E$	GP	Poorly graded gravel ^F	
		Gravels with Fines More than 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F, G, H}	
			Fines classify as CL or CH	GC	Clayey gravel ^{F, G, H}	
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines ^E	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$	SW	Well-graded sand ^I	
			$Cu < 6$ and/or $1 > Cc > 3^E$	SP	Poorly graded sand ^I	
		Sands with Fines More than 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G, H, I}	
			Fines classify as CL or CH	SC	Clayey sand ^{G, H, I}	
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silt and Clays Liquid limit less than 50	inorganic	$PI > 7$ and plots on or above "A" line ^J	CL	Lean clay ^{K, L, M}	
			$PI < 4$ or plots below "A" line ^J	ML	Silt ^{K, L, M}	
		organic	Liquid limit — oven dried	< 0.75	OL	Organic clay ^{K, L, M, N}
			Liquid limit — not dried			Organic silt ^{K, L, M, O}
	Silt and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay ^{K, L, M}	
			PI plots below "A" line	MH	Elastic silt ^{K, L, M}	
		organic	Liquid limit — oven dried	< 0.75	OH	Organic clay ^{K, L, M, P}
			Liquid limit — not dried			Organic silt ^{K, L, M, O}
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat	

^ABased on the material passing the 3-in. (75-mm) sieve.

^BIf field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^CGravels with 5 to 12% fines require dual symbols:

GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

^DSands with 5 to 12% fines require dual symbols:

SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

$$C_u = D_{60}/D_{10} \quad C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^EIf soil contains $\geq 15\%$ sand, add "with sand" to group name.

^FIf lines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^GIf lines are organic, add "with organic lines" to group name.

^HIf soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^IIf Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^KIf soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.

^LIf soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

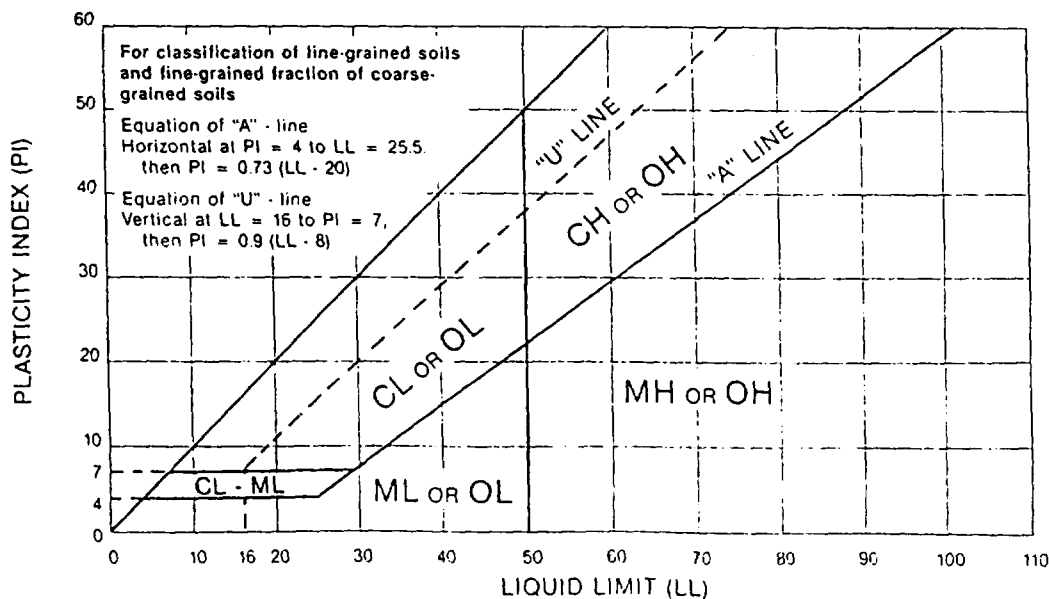
^MIf soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.



JoMar Telegrouting, Inc.

1914 Heather Lane
Joliet, Il. 60431

(815)436-8260

T.V. Inspection Report

Report#: 1

Contractor:		Project:	Riverdale Chemical
Location:	Chicago Heights, Il.	Date:	04-18-01
Street:	17th & Hanover	Inspector:	Terry Hoffman & Matt Anderson
Crew:	Mark - Shay		Joseph Schudt & Associates

Pipe Size:	8"	Pipe Condition:	Good
Pipe Type:	V.C.P.	MH Condition:	No steps
Pipe Lengths:	2'	Tape#:	1
Joint Type:	Unknown	Minutes:	0:00:10 - 0:13:18

T.V. From:	MH#C1	Upstream	To: MH# West	Run Ft.:	166'
------------	-------	----------	--------------	----------	------

Distance	Service Connection	Remarks
42	South	
44	North	
53		Offset joint
56		Open joint
61.5	South	
69.5	North	
2.5	North	
128	North	
142.5	North	
166		End of run

JoMar Telegrouting, Inc.

1914 Heather Lane
Joliet, Il. 60431

(815)436-8260

T.V. Inspection Report

Report#: 2

Contractor:		Project:	Riverdale Chemical
Location:	Chicago Heights, Il.	Date:	04-18-01
Street:	17th & Stewart	Inspector:	Terry Hoffman & Matt Anderson
Crew:	Mark - Shay		Joseph Schudt & Associates

Pipe Size:	18"	Pipe Condition:	Good
Pipe Type:	R.C.P.	MH Condition:	One step
Pipe Lengths:	2'	Tape#:	1
Joint Type:	Unknown	Minutes:	0:13:18 - 0:16:14

T.V. From:	MH#A18	Upstream	To: MH# East	Run Ft.:	82'
------------	--------	----------	--------------	----------	-----

Distance	Service Connection	Remarks
02 - 13		P.V.C.
20		Pipe makes bend
82		End of run

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Joliet, Il. 60431

(815)436-8260

T.V. Inspection Report

Report#: 3

Contractor:		Project:	Riverdale Chemical
Location:	Chicago Heights, Il.	Date:	04-18-01
Street:	17th St.	Inspector:	Terry Hoffman & Matt Anderson
Crew:	Mark - Shay		Joseph Schudt & Associates

Pipe Size:	36"	Pipe Condition:	Poor
Pipe Type:	R.C.P.	MH Condition:	One step
Pipe Lengths:		Tape#:	1
Joint Type:		Minutes:	0:16:14 - 0:40:18

T.V. From:	MH#A18	Upstream	To: MH# South	Run Ft.:	302'
------------	---------------	----------	---------------	----------	-------------

Distance	Service Connection	Remarks
02 - 302		Bottom of pipe deteriorated, missing
113	East/West	
222		Piece of clay pipe
302		End of run

JoMar Telegrouting, Inc.

1914 Heather Lane
Joliet, Il. 60431

(815)436-8260

T.V. Inspection Report

Report#: 4

Contractor:		Project:	Riverdale Chemical
Location:	Chicago Heights, Il.	Date:	04-18-01
Street:	17th St.	Inspector:	Terry Hoffman & Matt Anderson
Crew:	Mark - Shay		Joseph Schudt & Associates

Pipe Size:	36"	Pipe Condition:	Poor
Pipe Type:	R.C.P.	MH Condition:	
Pipe Lengths:	?	Tape#:	1
Joint Type:	Unknown	Minutes:	0:40:18 - 0:43:52

T.V. From:	MH#W1	Upstream	To: MH# South	Run Ft.:	68'
------------	-------	----------	---------------	----------	-----

Distance	Service Connection	Remarks
02 - 68		Bottom of pipe deteriorated, missing
68		Brick in line, unable to pass.
		End of run

JoMar Telegrouting, Inc.

1914 Heather Lane

Wollet, Il. 60431

(815)436-8260

T.V. Inspection Report

Report#: 5

Contractor:

Location: Chicago Heights, Il.

Street: 17th St.

Crew: Mark - Shay

Project:

Riverdale Chemical

Date:

04-18-01

Inspector:

Terry Hoffman & Matt Anderson

Joseph Schudt & Associates

Pipe Size: 24"

Pipe Type: R.C.P.

Pipe Lengths: 2'

Joint Type: Unknown

Pipe Condition: Poor

MH Condition:

Tape#: 1

Minutes: 0:43:52 - 0:45:52

T.V. From: MH#A18

Upstream

To: MH# West

Run Ft.: Unknown

Distance
Service
Connection

Remarks

50

Bend in line to the north
This is as far as inspectors wanted to T.V.

JoMar Telegrouting, Inc.
1914 Heather Lane
Joliet, Il. 60431

(815)436-8260

T.V. Inspection Report

Report#: 6

Contractor:		Project:	Riverdale Chemical
Location:	Chicago Heights, Il.	Date:	04-18-01
Street:	17th St.	Inspector:	Terry Hoffman & Matt Anderson
Crew:	Mark - Shay		Joseph Schudt & Associates
Pipe Size:	24"	Pipe Condition:	Poor
Pipe Type:	R.C.P.	MH Condition:	No steps, bricks missing
Pipe Lengths:	2'	Tape#:	1
Joint Type:	Unknown	Minutes:	0:45:52 - 0:47:58
T.V. From:	MH#B1	Upstream	To: MH# South
			Run Ft.: Unknown

Distance	Service Connection
----------	-----------------------

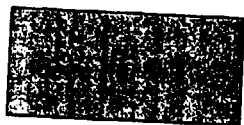
Remarks

15 - ?

Pipe collapsed, unable to pass

Appendix A

Site Improvements Program Documents



HEAVY DUTY PAVEMENT



LITE-DUTY PAVEMENT



CONCRETE PAVEMENT

Oversized maps can be viewed at U.S. EPA
Region V Superfund Records Center

RIVERDALE

220 E 17th ST

OVER

Date: 5-15-01

Scale: 1"=40'

Disk No.: 0098-site.dwg

Drawn: MCA

Checked: MCA

Sheet

2 OF 12

Job No.:

00-98

WALKWAY

7.56

FUTURE
BUILDING
&
CANOPY

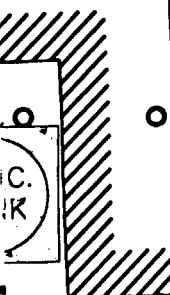
-6675

CONC.

EX. OVERHEAD DOOR
FF=666.50

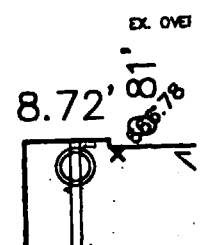
EX. CANOPY

Oversized maps can be viewed at U.S. EPA
Region V Superfund Records Center



32.33'
EX. DOOR

EX. OVERHEAD DOOR
FF=667.38



RIVERDALE
220 E 17th ST
NW QUARTER

Date: 5-15-01
Scale: 1"=20'
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Sheet
3 OF 12
Job No.:
00-98

Oversized maps can be viewed at U.S. EPA
Region V Superfund Records Center

RIVERDALE

220 E 17th STR

SW QUART

Date: 5-15-01

Scale: 1"=20'

Disk No.: 0098-site.dwg

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Checked: MCA

Sheet

5 OF 12

Job No.:

00-98

RIVERDALE

220 E 17th ST

SE QUART

Date: 5-15-01

Scale: 1"=20'

Disk No.: 0098-site.dwg

Drawn: MCA

Checked: MCA

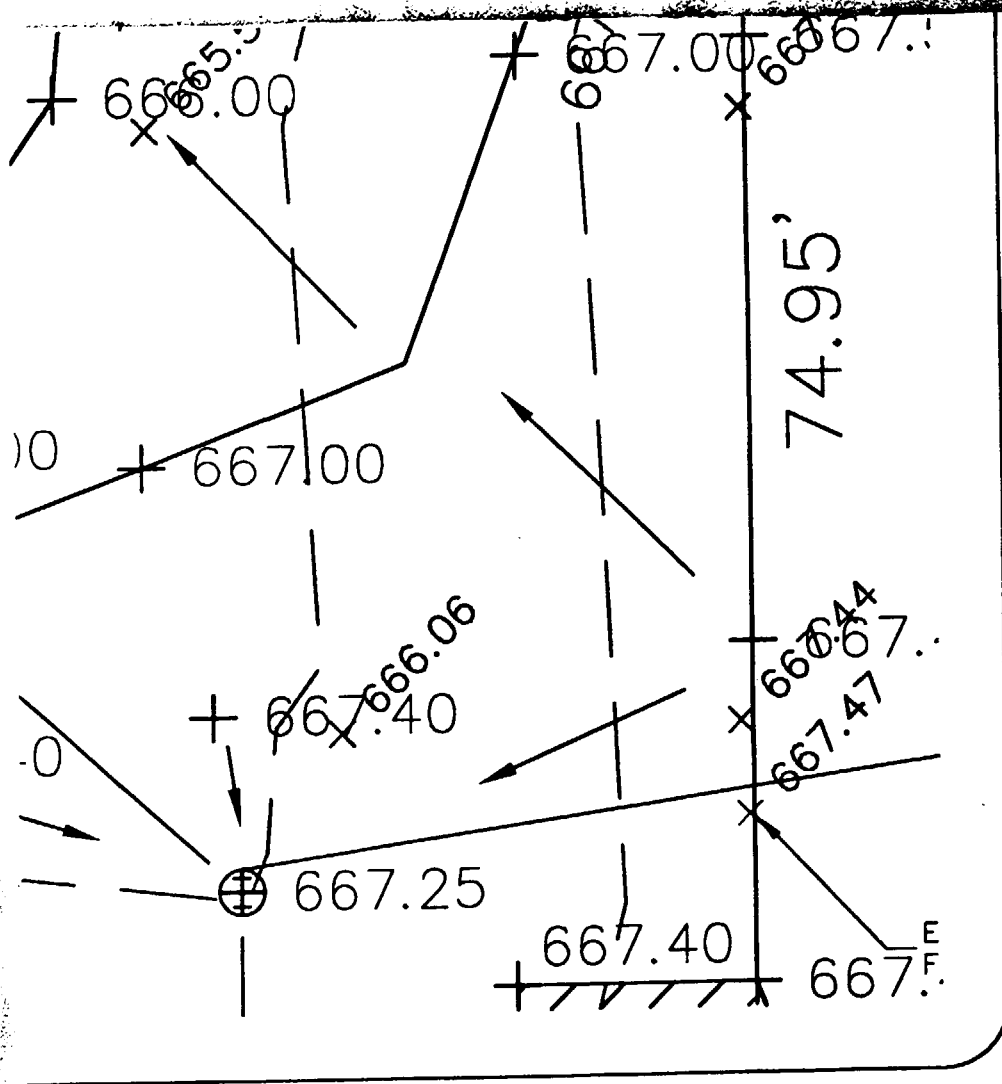
Sheet

6 OF 12

Job No.:

00-98

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Region V Superfund Records Center



RIVERDALE

220 E 17th STR

NE UTILITY

Date: 5-15-01

Scale: 1"=10'

Disk No.: 0098-site.dwg

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Sheet

7 OF 12

Job No.:

00-98

Oversized maps can be viewed at U.S. EPA
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Oversized maps can be viewed at U.S. EPA
Region V Superfund Records Center

RIVERDALE

220 E 17th ST

EAST UTILIT

Date: 5-15-01

Scale: 1"=20'

Disk No.: 0098-site.dwg

Drawn: MCA

Checked: MCA

Sheet

8 OF 12

Job No.:

00-98

Handicap Parking Sign



Handicap Parking Sign



RIVERDALE

220 E 17th

S

Oversized maps can be viewed at U.S. EPA
Region V Superfund Records Center

Date: 5-15-01

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Sheet

9 OF 13

Job No.:

00-98

C	D	E	G	R	APPROX. SLOPE
4' 7/8"	6'-7/8"	24"	2"	9"	1:2.4
3' 10"	6' 1"	30"	2 1/4"	11"	1:2.4
3' 1	Oversized maps can be viewed at U.S. EPA Region V Superfund Records Center				
38					
30					
19 3/4					
34 3/4"	8' 1-3/4"	72"	4"	20"	1:2.5
25"	8' 2"	78"	4 1/2"	22"	1:2.5
26"	8' 2"	84"	5"	22"	1:2.5

211a

RIVERDALE

220 E 17

Date: 5-15-01

Scale: NO SCALE

Disk No.: 0098DTL.DWG

Drawn: MCA

Checked: MCA

Sheet

10 OF 13

Job No.:

00-98

RIVERDALE

220 E 17

S

Date: 5-15-01

Scale: NO SCALE

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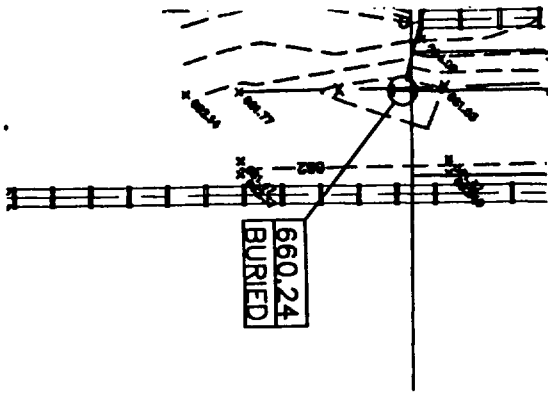
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Sheet

11 OF 13

Job No.:
00-98

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Region V Superfund Records Center

A. Schudt & Associates

5. HARLEM AVENUE FRANKFORT, IL 60423
708-720-1000 FAX: 708-720-1065
jas@jaseng.com <http://www.jaseng.com>

ENVIRONMENTAL LAND PLANNING GPS SERVICES

4-16-01

Sheet 2 of 2

0098-215

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100 HARLEM AVENUE FRANKFORT, IL 60423

708-720-1000 FAX: 708-720-1065

jas@jaseng.com <http://www.jaseng.com>

ENVIRONMENTAL LAND PLANNING GPS SERVICES

4-10-01

Sheet 1 of 2

0098-215

ch diameter, 10 foot
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walks at 50 foot

SION CONTROL

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and debris.

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"Standard Specifications".

Oversized maps can be viewed at U.S. EPA
Region V Superfund Records Center

REVIS

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JOSEPH

RIVERDALE CHEMICAL COMPANY

220 E 17th STREET, CHICAGO HTS, IL

NW QUARTER GRADING PLAN

Date: 5-15-01

Scale: NO SCALE

Disk No.: 0098SPC.DWG

Drawn: MCA

Checked: MCA

Sheet

13 OF 13

Job No.:

00-98

Appendix B

Construction Quality Assurance Plan



*Integrated
Environmental
Solutions*

222 South Riverside Plaza
Suite 820
Chicago, IL 60606
Telephone: 312-575-0200
Fax: 312-575-0300

APPENDIX B CONSTRUCTION QUALITY ASSURANCE PLAN

RIVERDALE CHEMICAL COMPANY

Prepared For
Riverdale Chemical Company
Chicago Heights, Illinois

Prepared By
RMT, Inc.
Chicago, Illinois

July 2001

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Section 1

Introduction

This Construction Quality Assurance Plan (CQAP) has been prepared for the Riverdale Chemical Site in Chicago Heights, Illinois. This CQAP addresses quality assurance for construction of the engineered barrier asphalt.

The main emphasis of this CQAP is careful documentation of the construction quality control process, from the selection of materials through installation of the site fence, excavation, and installation of the asphalt engineered barrier. The scope of this CQAP applies to manufacturing, shipping, handling, installing, and design guidelines. Specifications for construction of asphalt engineered barrier are provided in Appendix A of the Phase II RA Workplan.

The CQAP consists of a project description, a discussion of the project organization and responsibility, construction quality assurance activities including sample testing procedures, construction inspection, and documentation.

Section 2

Project Description

2.1 Project Objectives and Scope

Background information on the activities conducted at the Riverdale Chemical Company (Riverdale) is provided in the Phase I RA Workplan. The objectives of the Phase II RA include:

2.1.1 Asphalt Engineered Barrier

- Establish an asphalt engineered barrier to provide a barrier for impacted soils. (It should be noted that some area that does not contain impacted soil will be included within the barrier).
- Establish design slopes to allow adequate drainage.
- Install retention basin and retention pond.

2.1.2 Institutional Controls

- Place institutional controls in the form of deed restrictions on the site.

Section 3

Responsibility, Authority, and Qualifications

The responsibilities, authority, and qualifications identified in this CQAP are necessary to perform the construction activities. The overall project responsibilities are also described in the Phase II Workplan.

3.1 Owner

3.1.1 Definition

Riverdale is the responsible party for Phase II RA activities.

3.1.2 Responsibility and Authority

The Owner is responsible for all the construction contracts. The Owner is responsible for coordinating communications with the regulatory agency, Engineer, and Contractor for the project. The Owner is also responsible for initiating the inspections as presented in this CQAP. The Owner will serve as a liaison between all parties involved in construction to maintain communications.

3.1.3 Qualifications

The selection of the Owner' representative is the responsibility of the Owner. The Owner' representative should be familiar with the construction of asphalt engineered barrier and regulatory requirements of United States Environmental Protection Agency (U.S. EPA).

3.1.4 Submittals

The Owner is responsible for submitting required information to the U.S. EPA submittals include:

- Design drawings and specifications
- Progress reports
- Record drawings
- Construction Completion Report

3.2 Engineer

3.2.1 Definition

The Engineer is the individual/firm responsible for design of the asphalt engineered barrier system, including reports, drawings, plans, and specifications. The Engineer is also the individual/firm responsible for interpretation of the design plans and specifications during construction.

3.2.2 Responsibility and Authority

The Engineer is responsible for performing the engineering design and preparing the associated drawings and specifications for the Phase II RA construction activities. The Engineer is responsible for interpretation of the design, drawings, and specifications during construction. The Engineer is responsible for approving all design and specification changes and making design clarifications necessary during Phase II RA construction activities.

3.2.3 Qualifications

The Engineer must be a qualified professional engineer, licensed in the State of Illinois. The Engineer must be familiar with the following:

- Geotechnical design methods and procedures
- Installation of asphalt engineered barriers
- Applicable regulatory requirements

3.2.4 Submittals

The Engineer is responsible for submittal of the following documentation to the Owner:

- Design drawings and specifications
- Documentation of approved design changes

3.3 Construction Quality Assurance Engineer

3.3.1 Definition

The Construction Quality Assurance (CQA) Engineer is the engineer personally in charge of the construction quality assurance work. The duties of the CQA Engineer may be shared by two individuals, a CQA Engineer located in the office and a Site Technician (or Resident Observer) located at the site.

3.3.2 Responsibility and Authority

The Site Technician is responsible for observing and documenting activities related to the installation of the asphalt engineered barrier. The CQA Engineer will provide information on the field observations and documentation for preparing a Construction Completion Report as outlined in Section 6 – Documentation of this CQAP.

The Site Technician will observe and document the activities of the Contractors in sufficient detail and with sufficient continuity to provide a high level of confidence that the work product complies with the design plans and specifications. The CQA Engineer and/or the Site Technician will also verify that installation requirements are met and that all submittals from the Contractors are provided.

The Site Technician will maintain daily reports of activities. These reports will include, at a minimum, visual observations and test results. In addition, these reports will summarize significant events and problems encountered and resolved. These daily reports will be submitted to the CQA Engineer and RMT on a weekly basis.

Any differences between the CQA Engineer's interpretation of the design plans and specifications from the Contractors' interpretation must be resolved by the Engineer. If such assessment indicates any actual or suspected work deficiencies, the CQA Engineer must inform the Contractors of these deficiencies.

3.3.3 Qualifications

The CQA Engineer and the Site Technician must be experienced in the proportion of quality assurance documentation, including quality assurance forms, reports, and as-built drawings.

3.3.4 Submittals

The Site Technician will be responsible for submitting daily field reports to the CQA Engineer and RMT on a weekly basis throughout the construction period. The CQA Engineer will be responsible for submitting the information to be submitted with the Construction Completion Report and record drawings to the Owner and RMT.

3.4 Contractor

3.4.1 Definition

The Contractor is the individual/firm responsible for earthwork, including installation of the asphalt engineered barrier.

3.4.2 Responsibility and Authority

The Contractor is responsible for installing the engineered barrier. The Contractor may also be responsible for locating and transporting the required materials, and other work, as outlined in the specifications.

The Contractor will be under contract with the Owner.

3.4.3 Qualifications

The Contractor must be approved by the Owner. The Contractor must be able to provide qualified personnel to meet the demands of the project. The Contractor, unless otherwise approved by the Owner, must be qualified based on previously demonstrated experience and management ability. The Contractor must have experience with installation of asphalt engineered barriers.

Section 4

Asphalt Engineered Barrier

The asphalt consists of three layers. From top to bottom these layers consist of:

- Asphaltic Binder Material
- Crushed Aggregate Base Course
- Existing Sub-Grade

This section addresses the material evaluation and construction quality assurance procedures for installation of the asphalt engineered barrier.

4.1 Observation and Inspection

The CQA Engineer will be present on site during construction to document that construction of the asphalt engineered barrier is performed in accordance with the design plans and specifications. The CQA Engineer will be responsible for the following items:

- Observe the scarification, smooth drum rolling, and testing of the existing sub-grade layer.
- Perform field density tests for the existing sub-grade layer placed for the asphalt engineered barrier.
- Observe material used for the crushed aggregate base course so that unsuitable material is not used.
- Perform field density tests for the crushed aggregate base course placed for the asphalt engineered barrier.
- Observe and document earthwork adjacent to buildings.
- Observe and document construction of berms, swales, and infiltration basin.
- Obtain record survey information.
- Maintain daily field notes regarding project construction.
- Provide photographic documentation of major construction activities.

4.2 Construction Testing

In-field testing (and minimal laboratory testing) will be performed to document materials used and method of placement for the asphalt engineered barrier.

4.2.1 Existing Sub-Grade Layer

The existing sub-grade material will be scarified and compacted. It is anticipated that minimal additional material may be needed to bring existing grades to the bottom of the crushed aggregate base course.

The subbase layer surface will be visually observed and tested for adequate compaction, of the material, as detailed in the specifications.

4.2.2 Crushed Aggregate Base Course

The base course used for the asphalt engineered barrier will be tested in the field (and minimal laboratory testing). In-field testing will be performed at the frequency shown in Table 4-1 of this CQAP. Base course grade will be surveyed on a 50-foot grid. Testing will include the following:

- Field Moisture (ASTM D2922)
- Field Density (ASTM D3017)

4.2.3 Asphalt Binder

The asphalt binder will be tested in the field for thickness and compaction. In-field testing will be performed at the frequency shown in Table 1 of this CQAP. Testing will include the following:

- Field Density (ASTM D2950)
- Moisture – Density Relationship (ASTM D1559)

4.2.4 Storm Water and Erosion Control Structures

No field or laboratory testing is proposed for the storm water and erosion control structures.

4.3 Failing Tests or Materials

If failing field tests occur for any of the asphalt engineered barrier components, the area will be reworked and retested to achieve passing tests. If the material is incapable of achieving passing results, the material will be removed and replaced with acceptable material.

Section 5

Inspection Activities

5.1 Preconstruction Meeting

A preconstruction meeting will be held at the Riverdale site prior to beginning construction. A detailed project schedule included in the RD Report shows when the preconstruction meeting will occur. The preconstruction meeting must be attended by the Owner, the representatives of the Owner, the Engineer, the Contractor, CQA Engineer, and U.S. EPA. This CQAP will be reviewed and the responsibility of each party will be reviewed and clearly understood. A recommended agenda with specific topics for the preconstruction meeting is presented in Table 5-1 of this CQAP. The meeting will be documented by the representative of the owner and minutes will be transmitted to all participants.

5.2 Prefinal Inspection

As the project is nearing completion, a prefinal inspection meeting will be held at the Riverdale site. A detailed project schedule included in the RD Report shows when the prefinal inspection will occur. The prefinal inspection will be attended by the Owner, the representatives of the Owner, the Engineer, the Contractor, the CQA Engineer, and U.S. EPA. The prefinal inspection will consist of a walk-through inspection of the entire Riverdale site. The prefinal inspection will determine whether the project is being completed consistent with the contract documents. Any outstanding construction items noted during the prefinal inspection will be recorded. A prefinal inspection report will outline the outstanding construction items, actions required to resolve items, completion dates for these items, and the date for the final inspection.

5.3 Final Inspection

Upon completion of any outstanding construction items, a final inspection meeting will be held at the Riverdale site. A detailed project schedule included in the RD Report shows when the final inspection will occur. The final inspection must be attended by the Owner, the representatives of the Owner, the Engineer, the CQA Engineer, and U.S. EPA. The final inspection will consist of a walk-through inspection of the project site. The prefinal inspection report will be used as a checklist and will focus on the outstanding construction items.

Section 6

Documentation

Construction of the asphalt engineered barrier will be documented in accordance with the plans and specifications and this CQAP. The CQA Engineer must document that requirements of this CQAP have been addressed and satisfied. All changes will be documented. The CQA will provide the required information to RMT to be included in the Construction Completion Report.

The CQA Engineer must provide signed daily field reports, data sheets, and checklists to verify that monitoring activities have been carried out. The CQA Engineer must maintain at the job site a complete file of all documents that comprise or support this CQAP, including plans and specifications, checklists, test procedures, daily logs, and other pertinent documents.

Original documents will be stored by the CQA Engineer.

6.1 Daily Reports

Daily field reports will be prepared by the CQA Engineer to document the activities performed on site. Daily field reports must include:

- Observation and testing data sheets.
- Discussions between the representatives of the Contractor, the CQA Engineer, and the Owner.
- Documentation of construction problems and resolutions.

6.1.1 Observation and Testing Data Sheets

Observation and testing data sheets will be prepared daily. At a minimum, these data sheets must include the following information:

- An identifying sheet numbers for cross-referencing and document control.
- Data, project name, location, and other project identification information.
 - Documentation of weather conditions
 - Reduced scale site plan showing all current work areas and test locations
 - Descriptions and locations of ongoing construction
 - Equipment and personnel in each work area, including subcontractors

- Descriptions and specific locations of areas, or units, of work being tested and/or observed and documented (identified by lift and location)
- Locations where tests and samples were taken
- Summary of test results
- Calibrations or recalibrations of test equipment, and actions taken as a result of calibration
- Off-site materials received, including quality verification documentation
- Decisions made regarding acceptance of units of work, and/or corrective actions to be taken in instances of substandard quality
- Signature of CQA Engineer

Photographic reporting data sheets, where used, must be cross-referenced with Observation and Testing Data Sheets and/or Construction Problem and Resolution Data Sheets. The photographs will serve as a pictorial record of work progress, problems, and mitigation activities. The basic file will contain color prints. Negatives will be stored in a separate file.

6.1.2 Discussions Between Contractor, CQA Engineer, and Owner

A memorandum will be prepared when significant issues are identified and resolved summarizing discussions between the representative of the CQA Engineer and the Contractor. At a minimum, the memorandum will include the following information:

- Data, project name, location, and other project-related identification
- Name of parties involved in discussion
- Relevant subject matter or issues
- Activities planned
- Constraints and/or suggestions
- Schedule impacts
- Signature of the CQA Engineer

6.1.3 Construction Problems and Resolutions

Sheets describing special construction situations will be cross-referenced with specific Observation and Testing Data Sheets, and must include the following information:

- An identifying sheet number for cross-referencing and document control
- A detailed description of the situation or deficiency

- The location and probable cause of the situation or deficiency
- How and when the situation or deficiency was found or located
- Documentation of the response to the situation or deficiency
- Final results of any response
- Any measures taken to prevent a similar situation from occurring in the future
- Signature of the CQA Engineer

The Engineer must be made aware of any significant reoccurring activities that do not conform with the design and specifications.

6.2 Field Testing Reports

Records of field testing performed on components of the asphalt engineered barrier will be collated by the CQA Engineer. A summary list of test results will be prepared by the CQA Engineer on a continual basis.

6.3 Progress Reports

The Owner will submit signed monthly progress reports to the U.S. EPA during the construction phase. These progress reports will be incorporated with the monthly progress reports described in the Phase II Workplan and will include as a minimum (and as appropriate):

- A description and estimate of the percentage of the Phase II RA completed
- Summary of findings
- Summary of changes made in the Phase II RA during the reporting period
- Summaries of contacts with representatives of the local community, public interest groups, or State government during the reporting period
- Summary of problems or potential problems encountered during the reporting period
- Actions being taken to address these problems
- Changes in key personnel during the reporting period
- Projected work for the next reporting period
- Copies of daily reports, inspection reports, and data (if available)
- Comparisons of working schedule to project schedule
- Summaries of conference calls and meetings held during the reporting period between the Owner and the U.S. EPA

6.4 Inspection Reports

Inspection reports will be completed after each of the required inspections have occurred to document the inspections. Documentation of the inspections will be prepared and will be issued to all participants in the inspection meeting.

6.5 As-Built Drawings

As-built drawings of the asphalt engineered barrier will be prepared and included in the Construction Completion Report. The information will be presented on scale drawings both in plan view and in cross-section. At a minimum, the drawings will include the following:

- Record grades of the finished surface of each soil component
- Location of field tests and samples obtained for laboratory testing
- Details

6.6 Construction Completion Report

Following the final inspection, a Construction Completion Report will be prepared by RMT based on information provided by the CQA Engineer and submitted to the Owner for submittal to the U.S. EPA. The Construction Completion Report will confirm that the work has been performed in substantial compliance with the design plans and specifications. The Construction Completion Report will include the following:

- Summary of construction activities
- Observation and Testing Data Sheets, including sampling locations
- Construction problems and solutions
- Photographic documentation
- Changes from design and material specifications

6.7 Final Storage of Records

Final records of the construction of the asphalt engineered barrier will be maintained in the CQA Engineer's and RMT files. Copies of reports and other submittals will be retained by the Owner and the U.S. EPA.

Table 4-1
Construction Documentation Tests and Frequency
Riverdale Chemical Company

Test Type	Test Frequency
EXISTING SUB-GRADE FILL	
■ Survey-grade	As necessary
BASE COURSE	
■ Field dry density and moisture content	5/acre
■ Survey-grade	50-foot grid
ASPHALT BINDER	
■ Field dry density and moisture content	5/acre
■ Survey-grade	As necessary
■ Test Cores (thickness)	2/acre

Table 5-1
Preconstruction Meeting Agenda
Riverdale Chemical Company

1. Introduction
 - A. Identify Parties
 1. Owner
 2. Owner's Representative
 3. Engineer
 4. Contractor
 5. Construction Quality Assurance Engineer
 6. U.S. EPA
2. Tour Project Site
3. Tour Project Site
 - A. Construction Drawings and Specifications
 - B. Construction Quality Assurance Plan (CQAP)
 - C. Site Safety Plan
4. Define Lines of Communication
 - A. Proper Channels of Communication Between Parties Involved
 - B. Procedures for Documentation and Reporting Information
 - C. Distribution and Storage of Documents and Reports
 - D. Progress Meetings
 - E. Procedures for Approving Design Changes During Construction
5. Review Site Requirements
 - A. Safety Rules
 - B. Site Rules
 - C. Work Schedule
 - D. Storage of Materials
 - E. Available Facilities
6. Review Construction Issues
 - A. Scope of Work
 - B. Construction Drawings and Specifications
 - C. Construction Procedures
 1. Location of Stockpile Areas
 2. Proposed Construction Sequencing
 3. Equipment and Equipment Decontamination
 - D. Construction Schedule
 - E. Procedures for Preparing and Approving Change Orders
 - F. Site Safety Plan

7. Select Testing Equipment, Review Sampling and Testing Procedures
8. Review Construction Quality Assurance Plan
9. Establish Project Deliverables
 - A. Responsibilities
 1. Owner
 2. Owner's Representative
 3. Engineer
 4. Contractor
 5. Construction Quality Assurance Engineer
 - B. Distribution of Deliverables
 - C. Approval Procedures
 - D. Minutes of Meetings from the Party Assigned

Appendix C

Health and Safety Plan

APPENDIX C

HEALTH & SAFETY PLAN FOR THE PHASE 1 REMOVAL ACTION WORKPLAN

RIVERDALE CHEMICAL COMPANY

Prepared For
Riverdale Chemical Company
Chicago Heights, Illinois

Prepared By
RMT, Inc.
Chicago, Illinois

July 2000

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Preface

This Health and Safety Plan (HSP) for the Riverdale Chemical Company in Chicago Heights, Illinois, was developed for removal action work to be performed. It has been prepared for use by RMT, Inc. employees to meet the requirements of Occupational Health and Safety Administration Standards under 29 CFR 1910 and 1926 and related guidance. This document will be used as the minimum health and safety requirements for all contractors performing work associated with the removal action (removal action).

Acronyms

AOC	Administrative Order by Consent
ATSDR	Agency for Toxic Substances and Disease Registry
BN/As	Base neutral/acid extractables
CHTT	Chicago Heights Terminal Transfer Railroad
EE/CA	Engineering Evaluation/Cost Analysis
FIT	Field Investigation Team
FS	Feasibility study
HSC	Health and Safety Coordinator
HSP	Health and Safety Plan
HSR	Health and Safety Representative
IEPA	Illinois Environmental Protection Agency
IRM	Interim Remedial Measure
IT	IT Corporation
MSL	Mean Sea Level
OSHA	Occupational Safety and Health Administration
PHE	Public Health Evaluation
PM	Project Manager
RD/RA	Remedial design/remedial action
RI	Remedial investigation
RI/FS	Remedial investigation/feasibility study
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
USEPA	United States Environmental Protection Agency

Section 1

Introduction

1.1 Background

1.1.1 Site Description

The Riverdale site is approximately 5 acres and lies within the industrialized area zoned for heavy industry located in the southeastern portion of the City of Chicago Heights. The site is bounded on the north by the Chicago Heights Terminal Transfer Railroad (CHTT) tracks and East 17th Street, on the east by the Baltimore and Ohio Railroad tracks, on the south by the Michigan Central Railroad tracks, and on the west by a vacant lot (Figure 1). Low-density residential housing lies across East 17th Street from the site. The site is fenced on all sides by a 6-foot-high cyclone fence with a barbed wire header and has 24-hour security. The site is an active manufacturing facility used by Riverdale for the formulation, packaging, and shipment of agricultural and turf products.

Structures on the site include three main buildings, a smaller ancillary building, and an aboveground storage tank area (Figure 2). Building No. 1 is located at the west side of the site and is used as a Finished Goods Warehouse. Building No. 2, Manufacturing Building, contains the administrative offices, laboratory, and some manufacturing and packaging operations. Building No. 3 is used for raw material storage and manufacturing. Packaging supplies are contained in Building No. 4.

1.1.2 Site History and Regulatory Actions

The Riverdale Chemical Company site is an active facility used for the formulation and packaging of various agricultural and turf chemicals. Riverdale has been conducting an RI/FS under an AOC at the site since the 1980s.

In April 1984, a site study was conducted by the Field Investigation Team (FIT) as part of the National Dioxin Test Strategy Program. This study indicated the presence of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) and other pesticides in the surface soil at the site. Given the results of the FIT study, Riverdale completed an Interim Remedial Measure (IRM) to control exposure to contaminants under an AOC between the USEPA and Riverdale dated September 28, 1984. The IRM required placement of a geotextile fabric over the area containing the highest concentrations of contaminated soil

PLOT DATA

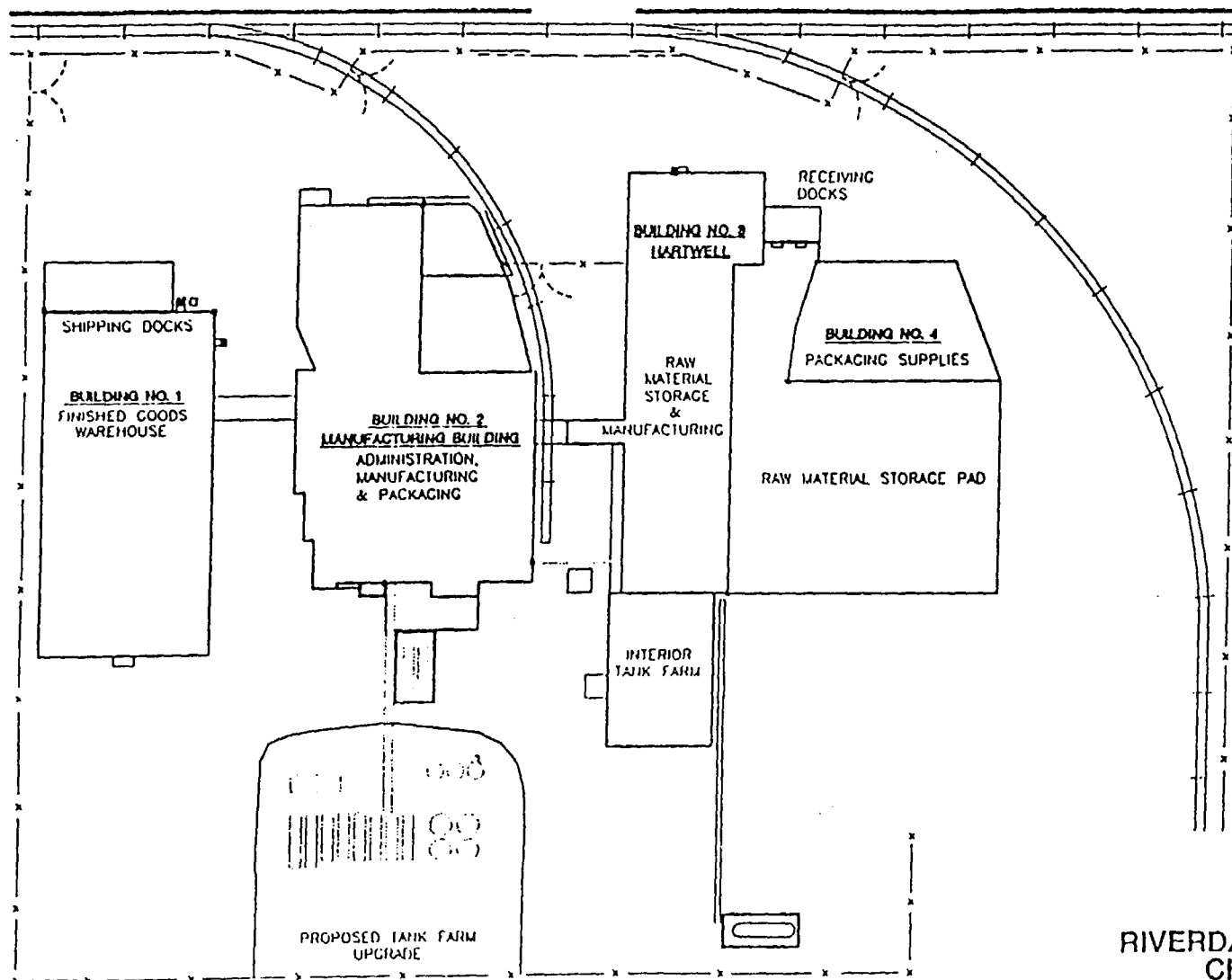
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Operator Name: MECHAMB
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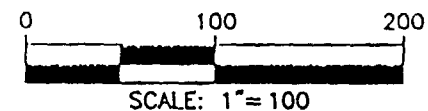
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Attached Xref's: No xref's Attached.

Plot Time: 2:19.3201 PM
Plot Date: Tuesday, October 12, 1999

RVT COMPUTER AIDED DESIGN & DRAFTING



LEGEND



**RIVERDALE CHEMICAL COMPANY
CHICAGO HEIGHTS, IL**

RMT

DWN. BY: MECHAMB
APPROVED BY:
DATE: OCTOBER 1999
PROJ. # 4962.01
FILE # 49620128.DWG

FIGURE 2

(approximately 19,600-square foot area) along with a barrier layer of 8 to 10 inches of crushed limestone, which is regularly inspected and maintained.

Riverdale entered into a separate AOC on February 27, 1985, to conduct the RI/FS at the site. Field work was conducted by IT between October 1985 and November 1986. The Final RI Report was submitted to the USEPA in April 1988. Riverdale continues to maintain the crushed limestone barrier along with other requirements of the IRM AOC.

A fire occurred at the facility on July 2, 1992, when a lightning strike apparently triggered a fire at the warehouse (Building 4). The warehouse contained various fungicide, herbicide, and insecticide products, including the active ingredients 2, 4, -D, Dicamba, 2, 4, -DP, MCPA, MCPP, and oxidizers. These products were stored in the brick construction warehouse on a concrete slab floor. It was estimated that the fire consumed 85 percent of the contents of the warehouse. After the fire was extinguished, the fire residue was contained within the shell of the warehouse, secured with plastic sheeting within a cyclone fence, and permitted for proper disposal. Water used to fight the fire was diverted, through emergency excavation procedures, to a low area north of the warehouse and to a drainage pond southeast of the warehouse. The water was sampled and contained 2, 4, -D up to 420 ppm; MCPA up to 70 ppm; 2, 4, DP up to 17 ppm; MCPP up to 14 ppm; fungicide up to 58 ppm; and dicamba up to 4.1 ppm. With the approval of the USEPA, the Illinois Environmental Protection Agency (IEPA), and the Thorn Creek Basin Sanitary District, the collected water was discharged to the sewer system for treatment.

In 1996, the Agency for Toxic Substances and Disease Registry (ATSDR) conducted a study of the surrounding residential areas at the request of the USEPA. On July 29, 1996, ATSDR issued a report summarizing soil sampling activities performed on May 2, 1996. The conclusion of the report stated that the concentrations of base neutral/acid extractables (BN/As) and organochlorine chemicals detected in the surface soil samples from residential properties adjacent to the site, do not pose a public health hazard. The report recommended no further activities as a result of the soil sampling.

The USEPA contacted Riverdale in December 1996 to discuss finalization of the RI Report. The USEPA provided minor comments to be included prior to approval. Riverdale incorporated the USEPA's comments; and, in addition, revised the RI Report to reflect current site conditions and current guidance. Specifically, the Risk Assessment was revised. Based on the Public Health Evaluation (PHE), the complete human exposure pathway includes industrial worker exposure to surface soil and construction worker exposure to subsurface soil.

In 1998, Riverdale conducted additional limited investigations to provide the USEPA with geological data to support the conclusions of the RI Report. This information was presented in letter reports to the USEPA on March 24, 1998, and April 13, 1998, and was not incorporated into the RI Report or FS Work Plan. The supplemental information developed included a geologic characterization of the subsurface soil, which confirms low hydraulic conductivity (10^{-8} cm/s) of underlying soil.

1.2 Site Characterization

1.2.1 Geology

The site is located on the boundary between the Chicago Lake Plain and the Wheaton Morainal Country units. The Chicago Lake Plain is characterized by a flat surface, underlain by till, which slopes gently toward Lake Michigan. The plain is interrupted by low beach ridges and morainic headlands and islands. The sand dunes common to the Calumet Lacustrine Plain are scarcely recognizable and found only in a few scattered localities.

1.2.2 Topography

The site is relatively flat with a gentle slope to the east. Elevations across the site range from approximately 672 feet above Mean Sea Level (M.S.L.) in the southwestern portion of the site to approximately 664 feet M.S.L. in the eastern portion of the site.

1.2.3 Climatology

Based on the monitoring station at nearby Park Forest, Illinois (5 miles east of the site), summer temperatures averaged between 58°F and 84°F, with 18 days exceeding 90°F during a typical year. Winter temperatures averaged between 13°F and 35°F with 123 days below 32°F and 12 days showing temperatures of 0°F and below for a typical year. Total precipitation averaged 35.2 inches per year, with the site receiving large amounts of precipitation from Lake Michigan in the form of snow squalls.

1.3 Purpose

This site-specific RMT Health and Safety Plan (HSP) has been developed to provide guidelines and procedures intended to protect the health and safety of RMT personnel performing site work. These site activities are defined in detail by the FS Report. The HSP will be reviewed and signed with all RMT field personnel (Appendix A) before site work is begun. Subcontractors will be required to develop and implement their own health and safety plan applicable to their

work on-site in accordance with OSHA requirements, Riverdale Chemical Company requirements, and this HSP.

Specific questions regarding the HSP should be addressed to the RMT Health and Safety Coordinator (HSC). A copy of the HSP will be available for review by site personnel and authorized visitors on request from the site RMT Health and Safety Representative (HSR). A copy of this plan will be provided to contractor/subcontractor personnel for their information and review prior to beginning site work.

The HSP will be reviewed periodically by the HSR and updated as necessary. The plan will also be updated to reflect new or additional site information when this information becomes available.

1.4 Scope

The HSP is aimed specifically at protecting RMT site workers from reasonably foreseeable health and safety hazards arising from the materials found at the Riverdale site as a result of undertaking site work. The procedures presented have been identified based on the analytical results from soil and surface water samples collected during previous site work.

The HSP has been developed in conformance with the following requirements and guidance:

- Occupational Safety and Health Administration (OSHA) Standards, 29 CFR 1910 and 1926, including 29 CFR 1910.120;
- NIOSH/OSHA/USCG/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985; and
- USEPA, *Standard Operating Safety Guides*, June 1992.

The HSP has been developed from technical information available as of May 1999 and is subject to revision as new data and information about the site and site activities become available. The plan shall cover employees performing site field work.

The removal action scope of work at the Riverdale site includes, but may not be limited to, the following tasks:

- Excavation
- Drilling
- Trenching
- Grading
- Placing coarse aggregate

- Placing asphaltic concrete
- Constructing containment structures

1.5 Applicability

The HSP applies to RMT personnel who participate in removal action activities. It contains the minimum requirements necessary to protect on-site personnel from physical, chemical, and other hazards particular to this site that have been identified as of the date of this HSP. More stringent practices than those outlined in this plan may be used, but this plan specifies the minimum practices to which personnel must adhere.

1.6 Responsibilities

The specific duties of those RMT personnel who are responsible for the HSP are as follows:

- *Project Manager (PM)* - Provides an overview of site facilities, equipment, and personnel so that site activities can be conducted in a safe and efficient manner. Obtains permission for site access and coordinate activities with appropriate officials.
- *Health and Safety Coordinator (HSC)* - Develops HSP in conjunction with Project Manager and site HSR; reviews plan periodically and revises plan when new information becomes available; offers technical support to site HSR on health and safety issues; and audits work activities for adherence to HSP.
- *Site Health and Safety Representative (HSR)* - Implements the HSP; advises field team on aspects of on-site health and safety; selects and reviews protective clothing and equipment with input from HSC; monitors the field team members for signs of heat or cold stress; monitors on-site hazards and conditions; knows emergency procedures, evacuation routes, and emergency telephone numbers; and notifies public emergency officials when necessary. Holds weekly health and safety meetings.
- *Other Site Personnel* - Responsible for adhering to the provisions of the site HSP and all OSHA requirements specified in the plan. Safely completes the on-site tasks required. Performs only those tasks that they believe can be done safely, and immediately reports any accidents and/or unsafe condition to the HSR, HSC, or PM.

1.7 Plan Components

The HSP contains information addressing the following areas:

- Health and safety training requirements
- Medical surveillance requirements
- Chemical and physical hazard evaluations and control measures
- Delineation of site work zones and contaminant control

- Decontamination procedures – personal and equipment
- Personal protective equipment and levels of protection
- Work limitations
- Contingency and emergency planning
- Logs, reports, and record keeping
- Safe work practices and safe guards
- Personal hygiene

Section 2

Health and Safety Training and Medical Surveillance

In order to meet OSHA requirements, all field personnel will participate in health and safety training and a medical surveillance program. Medical monitoring, as described in Section 2.2, is conducted off-site. The Medical Monitoring Equipment is maintained by the medical monitoring provider.

2.1 Health and Safety Training

Prior to beginning field activities, personnel conducting or observing on site activities will be certified in the following health and safety training sessions:

- *Site-specific Health and Safety Plan Review* - During this session, this plan will be reviewed, and any special procedures will be outlined.
- *Health and Safety for Hazardous Waste Site Activities* - This one-time 40-hour training session includes the following elements: regulations, industrial hygiene, toxicology, respiratory protection, physical hazards, noise, temperature extremes, personal protective equipment, medical surveillance, air monitoring equipment, site control and decontamination, standard operating procedures, and confined space entry.
- *8-hour Health and Safety Refresher Training* - This training is required annually after the initial 40-hour training. It serves to review the key aspects of the 40-hour training.
- Site personnel that have had 40-hour training will have had 3 day's actual field experience under the supervision of a trained, experienced supervisor.
- At least one team member will participate in Red Cross first aid and CPR course to more effectively handle physical and medical emergencies that may arise in the field.

Training will also be provided to additional field personnel so that backup personnel can be assigned to perform field activities at the site as the need arises.

Documentation of attendance in training sessions shall be maintained by the RMT Human Resources Department and the Health and Safety Coordinator. Site supervisory/management personnel have had supervisor training under 29 CFR 1910.120(e)(4).

The training requirements in OSHA Standard 29 CFR 1910.120 are to be followed by RMT employees.

2.2 Medical Surveillance

RMT field personnel assigned to the site will be placed in a medical surveillance program prior to performing their first field assignment. Medical surveillance requirements contained in OSHA Standards 29 CFR 1910.134 and 29 CFR 1910.120 will be followed, at a minimum, for RMT personnel who actively perform field sampling activities at the site. This surveillance will include an initial and annual medical examination.

The basic protocol for the medical examination includes the following:

- Health history
- Vital signs and physical examination screen
- Pulmonary function test
- Hematology survey
- Urinalysis
- Heavy metal screen
- Blood chemistry screen
- Vision test
- Hearing test

The initial examination includes an EKG and chest X-ray, in addition to the annual tests listed above. Field personnel assigned to conduct these investigations will have passed the required medical examination as determined by the occupational health physician before entering the project site.

The medical records of personnel are kept on file at the examining physician's clinic. A certificate of medical fitness or specified work restrictions is maintained in the employee's personnel file.

Section 3

Hazard Evaluation

This section describes the possible hazards associated with the Riverdale site based upon information available as of September 1999. The hazard evaluation has been prepared to meet the requirements of OSHA Standard 1910.120 and as such includes information regarding chemical hazards, physical hazards, and any other relevant site hazards.

Information regarding potential health effects associated with the site-related constituents is based upon maximum estimates of constituent concentrations and exposure parameters designed to err on the side of overestimating the potential occupationally-related risks. The primary potential exposure route would be accidental ingestion from contact with contaminants or contaminated articles. A secondary route of exposure would be inhalation of particles containing contaminants under dusty conditions.

3.1 Waste Description/Characterization

The following chemical information is presented in order to identify the types of materials that may be encountered at the facility.

These chemicals exist mainly in solid form. They may be toxic. Exposure limits for the chemicals of potential concern are presented in Table 3-1 and the tasks, hazardous, and control measures are shown in Table 3-2.

3.2 Physical Hazards

3.2.1 Ticks and Other Insects

The Riverdale site and surrounding areas contain grassy areas and scrub brush. Due to these site features, ticks may be encountered at the site during warm weather. An appropriate tick repellent shall be available on site for personnel use. A detailed discussion of Lyme disease is included as Appendix B.

Site personnel who are allergic to insect stings will have a personal bee sting kit or equivalent onsite for emergency use.

Table 3-1
Exposure Limits
Non-time Critical Removal Action
Riverdale Chemical Company
Chicago Heights, Illinois

SUBSTANCE NAME ⁽¹⁾	MEDIA	KNOWN CONCENTRATION LEVELS PRESENT ⁽¹⁾	POTENTIAL ROUTES OF EXPOSURE	ACGIH TLV ⁽²⁾	OSHA PEL ⁽³⁾
Aldrin	Impacted soil	Max.: 530 mg/kg	Absorption, accidental ingestion and dermal	0.25 mg/m ³	0.25 mg/m ³
Dieldrin	Impacted soil	Max.: 210 mg/kg	Absorption, accidental ingestion and dermal	0.25 mg/m ³	0.25 mg/m ³
Chlordane	Impacted soil	Max.: 1100 mg/kg	Absorption, accidental ingestion and dermal	0.5 mg/m ³	0.5 mg/m ³
4,4'-DDT	Impacted soil	Max.: 33 mg/kg	Absorption, accidental ingestion and dermal	1 mg/m ³	1 mg/m ³
4,4'-DDE	Impacted soil	Max.: 4.9 mg/kg	Absorption, accidental ingestion and dermal	None established	None established
4,4'-DDD	Impacted soil	Max.: 37 mg/kg	Absorption, accidental ingestion and dermal	None established	None established
Endrin ketone	Impacted soil	Max.: 6.1 mg/kg	Absorption, accidental ingestion and dermal	None established	None established
Heptachlor	Impacted soil	Max.: 68 mg/kg	Absorption, accidental ingestion and dermal	0.05 mg/m ³	0.5 mg/m ³
2,3,7,8-TCDD	Impacted soil	Max.: 197 mg/kg	Absorption, accidental ingestion and dermal		None established

Notes:

PEL Permissible exposure limit.
ppm Parts per million.
STEL Short-term exposure limit.
TLV[®] Threshold limit value.
mg/kg Milligrams per kilogram.
mg/m³ Milligrams per cubic meter.

Footnotes:

- (1) Source: RI Report, Table 14, Summary of Chemical Analysis.
(2) American Conference of Governmental Hygienists (ACGIH) Threshold Limit Values (TLV[®]) for 1999.
(3) Permissible Exposure Limits (PELs), U.S. Department of Labor, OSHA.

Table 3-2
Specific Hazard Assessment
Non-Time Critical Removal Action
Riverdale Chemical Company
Chicago Heights, Illinois

HAZARD	CONTROL MEASURE
Impacted soil	Dust control will be used during periods of high winds and remediation activities, when the crushed limestone barrier is removed, and soil is disturbed. Water spray or mist will be used to control blowing soil particles.
Heavy equipment operation	Standard safety procedures will be practiced. Contractor is responsible for safe operation of equipment. Remain in line of sight of operator and out of reach of equipment.
Noise	Hearing protection must be worn if noise level exceeds 85 dBA.
Underground utilities	Underground utilities will be located and marked by contractor.
Overhead utilities	A minimum clearance of 15 feet must be maintained between equipment and overhead lines.
Slippery Ground	Exercise caution

3.2.2 Poison Plants

Poison ivy, poison oak, and poison sumac may be encountered. The key to protection from these urushiol-containing plants is the ability to recognize and avoid the plants that carry the poison. A full discussion of identification, avoidance, and treatment of poison plants is included in Appendix C.

3.2.3 Confined Spaces

It is not anticipated that confined space entry will be required for the field activities. If confined space entry is required, the HSC will prepare a written entry plan and permit. Personnel shall not enter confined spaces without proper training and equipment.

3.2.4 Utilities

Overhead or underground utilities, such as electric, gas, telephone, water, sewer, or drainage, in the project work areas will be located by contractors before the start of operations that require subsurface work or the moving and setup of heavy equipment by the contractor. Information regarding the location of utilities will be kept at the field site for reference.

Overhead utilities must have brush guards installed if they are within any possible reach or swing of any piece of equipment. Power lines must be grounded dead if excavation equipment is operated in the area, subject to the following limitations:

- 15-foot-radius for power lines up to 250,000 volts
- 20-foot-radius for power lines over 250,000 volts

Absolutely no work may be performed within 15 feet of energized lines.

3.2.5 Heavy Equipment

Heavy equipment, such as drilling equipment, used on site is under the control of the subcontractor, who is responsible for maintaining the equipment in good working order and operating it safely. Heavy equipment must have audible backup alarms in working condition. RMT personnel will not work near equipment that they judge to be unsafe because of deterioration, missing parts, obvious defects, or improper operation.

Operation of heavy equipment in areas with steep embankments or unstable ground will be avoided. If it is necessary to operate equipment in these areas, the subcontractor will make provisions for the safety of RMT personnel in the area.

3.2.6 Noise

Hearing protection must be worn by personnel when they are exposed to noise levels above 84 decibels (dBA). Heavy equipment, when in operation, generally results in exposure levels that exceed 84 dBA for personnel working at or near the equipment. A "rule of thumb" to follow is for personnel to wear hearing protection if they must raise their voice to be heard at arm's length. RMT personnel will comply with the RMT Hearing Conservation Program.

3.2.7 Temperature Extremes

Adverse weather conditions are important considerations in planning and conducting site operations. Hot or cold weather can cause physical discomfort, loss of efficiency, and personal injury. The time frame of the removal action will cause site personnel to potentially be exposed to both heat stress and cold stress.

Cold Stress

Persons working outdoors in low temperatures, especially at or below freezing are subject to cold stress. Areas of the body that have a high surface area-to-volume ratio, such as fingers, toes, and ears, are the most susceptible to damage.

Protective clothing generally does not afford protection against cold stress. In many instances, it increases susceptibility due to a reduction in wind chill awareness and exposure to lower than perceived ambient temperatures.

Two factors influence the development of cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. A copy of the wind chill chart is included as Table 3-3.

Site personnel will be instructed on the signs and symptoms of cold stress and on the methods of preventing cold-related disorders. In general, the two major cold-related disorders are frostbite and hypothermia.

- *Frostbite* - Sudden blanching of the skin, progressing to skin with a waxy or white appearance that is firm to the touch, while the tissue beneath the skin is resilient. For treatment bring the victim indoors, and warm the areas quickly in warm water. Never place frostbitten tissue in hot water as the area will have a reduced heat awareness and such treatment may result in burns. Give the victim a warm drink. The victim must not smoke. Keep the frozen parts in warm water or covered with warm clothes for 30 minutes. The tissue will be very painful as it thaws. Then, elevate the injured area and protect it from physical injury. Do not allow blisters to be broken. Use sterile, soft, dry material to cover the injured areas. Keep the victim warm and get immediate medical care.
- *Hypothermia* - Hypothermia may be of greatest concern in the winter months and may be caused by exposure to freezing or rapidly dropping temperature. The symptoms of systemic hypothermia are usually exhibited in the following stages:
 - Shivering
 - Apathy, listlessness, drowsiness, and (sometimes) rapid cooling of the body to less than 95°F
 - Unconsciousness, glassy stare, slow pulse, and slow respiratory rate
 - Freezing of the extremities
 - For treatment, keep the victim warm and get immediate medical care.

Table 3-3
Windchill Chart
Non-Time Critical Removal Action
Riverdale Chemical Company
Chicago Heights, Illinois

Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (°F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
Wind speeds greater than 40 mph have little additional effect	LITTLE DANGER For less than 1 hour with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within 1 minute.			GREAT DANGER Flesh may freeze within 30 seconds.				
	Trenchfoot and immersion foot may occur at any point on this chart.											

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

Each person will watch for personal signs of frostbite and hypothermia as well as signs in team members. If temperatures drop below 20°F, as measured by the wind chill index, thermal clothing shall be required and field activities should be curtailed unless the activity is of an emergency nature.

Heat Stress

The USEPA Standard Operating Safety Guides (1992) recommend that a heat stress monitoring program be implemented when employees are wearing impervious clothing and ambient temperatures are 70°F or above. The frequency of monitoring should increase as temperatures increase, and employees should be monitored after each 2-hour work period when ambient temperatures exceed 85°F. The following paragraph describes the monitoring program recommended by the USEPA that will be used by personnel when ambient temperatures exceed 70°F.

Heart rate (HR) should be measured at the radial pulse for 30 seconds as early as possible in the resting period. Site personnel will measure their pulse at the wrist or side of the neck, with the timed interval provided by another site worker with a watch. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 33 percent while the length of the rest period stays the same. If the pulse rate is 110 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by another 33 percent.

All personnel must be instructed on the symptoms of the main heat-related disorders and how to recognize these disorders. These disorders and their symptoms are outlined below:

- *Heat Rash:* Decreased ability to tolerate heat, chafing clothes, raised red vesicles on affected areas
- *Heat Cramps:* Muscle spasms and pain in the extremities and abdomen
- *Heat Exhaustion:* Shallow breathing; pale, cool, moist, clammy skin; profuse sweating; dizziness and lassitude; fainting. Medical attention is warranted.
- *Heat Stroke:* Red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong rapid pulse; coma. *This condition is life-threatening, and immediate medical assistance must be obtained.*

Because it may not always be feasible to follow the work/rest regimen outlined above, site personnel should take a break every 2 hours, at a minimum, and drink adequate amounts of nonalcoholic fluids (electro light fluids). Site personnel will use a watch to determine the appropriate break intervals. An average of one quart of liquid (electro light fluids) per hour is recommended. In addition, the following actions can help reduce heat stress:

- In extremely hot weather, conduct non-emergency response operations in the early morning and evening.
- In hot weather, rotate workers wearing protective clothing.
- Clothing should be permitted to dry during rest periods. Workers who notice skin problems should immediately consult the site HRS.

Section 4

Site Control Measures

Site control minimizes the transfer of contaminants from and within the project site. Two contamination control methods are the establishment of work zones at the project site and the decontamination of field personnel and equipment.

4.1 Work Zones

Where necessary to prevent the spread of contaminants during the work, field personnel will delineate an exclusion zone, contamination reduction zone, and support zone. The exact locations will be determined at the start of the work dependent on accessibility, traffic, support functions, and other parameters affecting the location selection. The exclusion zones includes the areas of potentially contaminated surface soil. All work zones containing open excavations will be marked by barrier tape and cones. During site operations, the boundaries may be modified and adjusted, as more information becomes available.

4.1.1 Exclusion Zones

The exclusion zones are areas where hazardous substances may be present, based on available information. RMT personnel entering exclusion zones will be required to wear the required protective clothing as outlined in Section 5. The entry and exit points will be established at the periphery of the exclusion zone.

4.1.2 Contamination Reduction Zone

The contamination reduction zone is a transition zone between contaminated, or potentially contaminated, and clean zones. It serves as a buffer to reduce the possibility of the support zone becoming contaminated. The contaminant reduction zone will be just outside of the temporary exclusion zones.

Decontamination procedures, outlined in Subsection 4.2, will be performed in the contamination reduction zones for all source areas. Personnel entering and exiting the contamination reduction zones will have one entry/exit check point at the support boundary of the contamination reduction zone.

Field personnel will wear the required Level D personal protection while working in the contamination reduction zones. Before personnel enter the support zones, they will

remove protective equipment worn in the contamination reduction zones according to the procedures presented in Subsection 4.2.

4.1.3 Support Zone

The support zone is a noncontaminated or clean area. The support zones will be located outside of the contamination reduction zones. Protective clothing is not required in this area. Support equipment, such as clean protective equipment or supplies, will be located in these zones, which will include a support trailer or field vehicle. The location of the support zone and any support facilities will be determined based on the following factors:

- Accessibility
- Support services—electric power supply, roads, drinking water, etc.
- Wind direction

4.2 Decontamination Procedures

Whenever field personnel or equipment leave the exclusion zones, they must follow prescribed decontamination procedures. Protective outer garments will be removed, and placed in disposable plastic bags at the perimeter of the contamination reduction zone. Level D decontamination procedures will be as follows:

- Remove gross soil and sediment from boots and gloves with water and brush.
- Remove outer gloves first, if used. Remove protective coveralls by rolling them inside out from the upper torso to the feet.
- Wash/rinse impervious safety boots as appropriate before removing them when leaving the support zone. After removal, place boots in a plastic bag for transport to the next exclusion zone.
- Remove inner gloves if used.
- Wash and dry your hands before leaving the contamination reduction zone, and place used paper towels in the disposal bag.

If Level C personnel protection is used, decontamination procedures will be as follows:

- Remove gross soil and sediment from boots and gloves with water and brush.
- Remove outer gloves first, if used. Remove protective coveralls by rolling them inside out from the upper torso to the feet.
- Remove respiratory protection, discard cartridges as required.

- Wash/rinse impervious safety boots as appropriate before removing them when leaving the support zone. After removal, place boots in a plastic bag for transport to the next exclusion zone.
- Remove inner gloves if used.
- Wash and dry your hands before leaving the contamination reduction zone, and place used paper towels in the disposal bag.

The plastic bags containing the protective equipment waste materials will be stored on-site in a covered container.

Clean outer garments will be kept accessible to field personnel in an area free from potential contamination in the support zone. Water, soap, and paper towels will be kept in a clean location for both regular clean-up and emergency use.

Equipment Decontamination

A temporary impermeable decontamination area will be established in the area. The containment will include provision for the collection of wastewater and soil that is generated by the decontamination process. Management of these investigation-derived wastes (IDW) is described in the FSAP. The area will be equipped with a high-pressure hot-water spray washer and a tank or drums for the storage of water used in decontamination.

All downhole drilling equipment, excavation equipment or other vehicles, as required, will be decontaminated prior to the start of drilling at each proposed location and will be decontaminated at the end of the field investigation. This drilling equipment includes, but is not limited to, items such as hollow-stemmed augers, drilling rods, soil samplers, surge blocks and rods, and pumps. The OSC (or designee) will be responsible for ensuring that all downhole equipment is subjected to decontamination.

Decontamination will be by high-pressure hot-water washing within the decontamination area. The OSC (or designee) will be responsible for checking that the equipment is properly cleaned.

The aboveground portions of drill rigs and other support vehicles will, at a minimum, be decontaminated before the start, and at the end, of the field investigation. If the drilling vehicles come into contact with subsurface soil, the vehicle will be decontaminated before beginning work at a new boring location.

4.3 Other Site Personnel

Other site personnel refers to government employees, nonessential contractor personnel, local community representatives, and any other person not actively involved in the removal action that enter the work zones. Other site personnel entering the facility to observe or participate in field activities must report directly to the HSR upon reaching the source area under investigation.

In order to enter the exclusion zones and the contamination reduction zones, other site personnel must sign a waiver prior to site entry. The Waiver Statement is provided in Appendix A. Upon authorization by the HSR, they may enter the exclusion zones and the contamination reduction zones. All personnel entering the exclusion zone should have the proper training, medical monitoring and PPE. Other site personnel must review the RMT HSP prior to entry and should, as a minimum, follow the guidelines specified in the plan. However, visitors are responsible for providing their own health and safety plan and protective equipment and must accept responsibility for their personal health and safety while on-site as indicated on the waiver. Entry authorization to visitors by the HSR does not constitute acceptance on the part of the HSR, RMT, or Riverdale Chemical Company of responsibility for visitor health and safety plan adequacy or visitor safety.

Other personnel who enter the exclusion zones must follow prescribed decontamination procedures as described in this RMT HSP upon exiting.

If a fire, explosion, or toxic gas/vapor release occurs while visitors are present on site, the visitors will immediately evacuate the area, using the evacuation plan as outlined in Subsection 6.2.

4.4 Work Limitations

The following work limitations will apply to all field personnel working onsite.

- No smoking will be allowed in the exclusion or contamination reduction zones or additional on-site locations identified by RMT.
- No eating, drinking, or chewing gum or tobacco will be allowed in the exclusion or contamination reduction zones.
- Seat belts are required to be used in all moving vehicles.
- All personnel and equipment leaving the exclusion zones must be properly decontaminated prior to leaving the site. Personnel decontamination procedures are described in this document. Equipment decontamination procedures are described in the Field Sampling and Analysis Plan and Section 4.2 of this HSP.

- When possible, on-site work will be limited to daylight hours. If work must be done at night, illumination levels will conform to OSHA Construction Standard 29 CFR 1926.56 and OSHA 29 CFR 1910.120.
- Work will be suspended if weather conditions are; (1) significantly windy and dry, causing visible levels of potentially contaminated particulates to become airborne; or, (2) if lightning and other storm conditions threaten worker safety. As described in Table 3-2 of this HSP, engineering controls, such as water, will be used to control blowing soil particles.
- If work is suspended, the type of monitoring equipment which may be utilized, if necessary, may include an ultraviolet photoionization detector (HNU) or airborne particulate sampler.

4.5 Site Communication

Two communication systems should be established during hazardous waste operations; an internal communication among personnel on-site, and an external communication between on-site and off-site personnel.

Internal communications at site are to:

- Alert personnel to emergencies
- Convey safety information (e.g., amount of time left in air tanks, heat stress check, etc.)
- Communicate changes in work to be performed
- Maintain site control

Often at a site, communications can be impeded by background noise and the use of personal protective equipment. For communications to be effective, commands must be pre-arranged. In addition, audio or visual cues can aid in conveying the message. Some common internal communication devices are: two-way radios, noisemakers (e.g., bells, whistles, compressed air horns, etc.), and visual signals (e.g., flags, hand signals, and lights). Radios used in the Exclusion Zone must be intrinsically safe and not capable of sparking.

An external communication system between on-site and off-site personnel is necessary to:

- Report to management
- Coordinate emergency response
- Maintain contact with essential off-site personnel

The primary means of external communication is the telephone. If a telephone is not present at the site, all team members must know where the nearest telephone is located. The correct change and necessary telephone numbers should be readily available.

Section 5

Personal Protective Equipment

5.1 Introduction

Protective clothing must be worn whenever the potential exists for employees to come in contact with or to be exposed to affected material. Worker personal protective equipment (PPE) for intrusive activities will begin at modified Level D protection based on the most current information available on potential health and safety hazards at the site. Another means of protection includes employing work limitations.

5.2 Levels of Protection

Two levels of protection are specified in this HSP. A modified Level D will be the standard level of protection applied throughout the field activities. Levels of protection higher than D (e.g., C) are not anticipated to be needed at this site. As noted elsewhere, should site conditions indicate that Level D protection is not adequate, all work will stop and site conditions and personal protection will be reevaluated.

Intrusive activities are defined as excavating test pits and trenches, conformance sampling of soil, and general grading. Modified level D protection will consist of the following:

- Steel-toed, impervious work boots;
- Hard hat (when overhead hazards exist or heavy equipment is in use);
- Hearing protection (if required as described in Subsection 3.2.6);
- Eye protection with permanently mounted side shields; and
- Disposable nitrile or vinyl inner gloves (when the potential for hand contact with contaminants exists).

Section 6

Contingency Plan

This contingency plan provides the emergency information needed should there be a sudden life- or health-threatening situation where work activities are being conducted. The provisions of the contingency plan are to be implemented immediately in the event of a fire, explosion, or accident which could threaten human health or the environment.

6.1 Emergency Contacts

Emergency contacts and phone numbers for use in emergency situations occurring during field activities are detailed below:

EMERGENCY CONTACT	TELEPHONE NUMBERS
Ambulance	911
Police	911
Fire Department	911
Hospital Emergency Room Saint James Hospital ⁽¹⁾	(708) 756-1000
IEPA – Land Pollution Control Division	(217) 782-6761
IEPA Emergency Removal Unit	(217) 782-3637
Illinois Emergency Service Disaster Agency	(800) 782-7860
National Poison Center	(800) 942-5969
National Response Center	(800) 424-8802
CHEMTREC	(800) 424-9300
U.S. Environmental Protection Agency Emergency Environmental Response (Chicago) Hazardous Waste Hotline	(312) 353-2318 (800) 621-3191
Site Health and Safety Representative	To Be Established
RMT Project Manager Rae Mindock	(W) (312) 575-0200 (H) (773) 728-3088
Health and Safety Coordinator Shannon Posey	(W) (864) 281-0300
Facility Manager Peter Bibby	(W) (708) 756-2010
RMT Corporate Health and Safety Manager Shannon Posey	(W) (864) 234-9431 (H) (864) 213-5989 (Cell) (847) 867-9634 Emergency pager only (888) 576-1899

NOTES:

⁽¹⁾ Hospital map attached in Appendix D:

Saint James Hospital
1423 Chicago Road
Chicago Heights, Illinois 60411

6.2 Emergency Procedures

If an emergency situation develops at the site, the discoverer will notify the HSR who will perform the following:

- Evacuate visitors and nonessential site personnel from the site.
- Notify any other affected personnel at the site.
- Call 911 and give the operator the location and nature of the emergency. The operator will notify the proper emergency services (fire, ambulance, police, etc.) for assistance. Answer all operator questions and let the operator hang up first.
- Determine and initiate (if necessary), in conjunction with emergency personnel, evacuation of residents in the surrounding community.
- Contact the HSC to inform him/her of the incident as soon as possible.
- Contact the RMT PM to inform him/her of the incident as soon as possible.
- Prepare a written summary report of the incident and an Initial Report of Incident form (Appendix E) for the RMT HSC as soon as possible, but no later than 24 hours, after the incident.
- Take appropriate corrective actions at the site prior to authorizing the continuation of work.

If the HSR is not available, the person discovering the emergency situation will initiate the above actions.

6.3 Medical Emergency

If a first aid or medical emergency occurs, the person should be transported to the Saint James Hospital, 1423 Chicago Road, Chicago Heights, Illinois. A map containing the emergency route to the hospital is contained in Appendix D. The map will be posted at a prominent location on site which will be identified prior to beginning field activities. The location will be discussed during the daily health and safety meeting. RMT employees are trained by the American Red Cross in first aid and CPR, and can administer first aid and CPR, if necessary. RMT employees will comply with the RMT Bloodborne Pathogen Program to properly protect themselves from potential contact with bloodborne pathogens, and to properly dispose of any waste generated.

6.4 Emergency Equipment

Emergency equipment that will be available onsite with field personnel will include the following:

- First-aid kits/bloodborne pathogen kits,
- Eyewash (squeeze bottle), and

- Fire extinguishers
- Five gallons of fresh water (for flushing of skin, general washing)

6.5 General On-site First Aid

The following discusses general on-site First Aid procedures for exposure to contaminants on-site:

- **Contaminated Material in Eyes** – Wash with copious amounts of water for at least 15 minutes. Lift upper and lower lids occasionally. Seek medical attention immediately.
- **Contaminated Materials Contact Skin** – For organic materials, promptly wash area with soap or mild detergent and water. For corrosive materials, flush with water for at least 5 minutes. Do not rub. Check for signs of skin irritation. Seek medical attention if unusual appearance of skin or sensation is noted.
- **Contaminated Materials Penetrate Protective Clothing** – Discard protective clothing and underlying clothing. Wash skin as described above. Confer with HSC in selection of new protective clothing.
- **Inhalation of Contaminated Air** – Move person to well ventilated area at once. If individual is not noticeably effected, and has no side effects after 15 minutes, returning to work is allowed providing the work area is no longer contaminated. If individual has not fully recovered, continue to monitor for 15 to 20 additional minutes and seek medical attention if necessary. Use artificial respiration if breathing has stopped. In such instances, seek medical attention after victim has resumed breathing. If possible, have someone seek medical attention while person is being resuscitated.
- **Ingestion of Contaminated Materials** – Flush mouth with water, being careful not to swallow. Contact local poison center (see telephone number in Emergency Response and Information section). When called for, induce vomiting and give fluids (preferably water) to drink. (DO NOT induce vomiting or give fluids to any unconscious persons.) Seek medical attention promptly.

If at any time, personnel feel fatigued, dizzy, nauseous, or experience headaches, they are to be moved to a well ventilated area and allowed to rest for 15 to 30 minutes. If symptoms do not subside, seek medical attention. Should personnel exhibit symptoms of temperature stress, follow the guidelines for treatment contained in Subsection 3.2.7 of this plan.

6.6 Emergency Route

Appendix D contains a map of the emergency route to the hospital.

Section 7

Record Keeping

This section discusses the records that will be maintained as part of this health and safety plan.

7.1 Training Attendance

A copy of each employee's certificate verifying the completion of the 40-hour Health and Safety Training for Hazardous Waste Sites is maintained in the employee's personnel file. Each employee retains the original certificate issued.

Site-specific health and safety plan review is documented by a sign-in sheet. The sign-in sheet is kept in the project file and is included as Appendix A. RMT's Incident Forms are provided in Appendix E. As stated on the forms, the report should be submitted to the HSC, who will submit the forms to the Superfund HSR and other appropriate individuals.

7.2 Medical Certification

Personnel must receive periodic physical exams to determine their ability to wear a respirator and perform required job functions. The physician conducting the examination must provide a certification of medical fitness for the tasks described and any work restrictions or limitations the employee may have. A copy of this certification and the employee's medical information is maintained in the employee's personnel file.

Section 8

References

- IT Corporation. 1998. Draft Feasibility Study Work Plan. Riverdale Chemical Company, Chicago Heights, Illinois.
- IT Corporation. 1999. Draft Work Plan for Engineering Evaluation/Cost Analysis. Riverdale Chemical Site. Chicago Heights, Illinois. February 1999.
- NIOSH/OSHA/USCG/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*. October 1985.
- Occupational Safety and Health Administration (OSHA) Standards, 29 CFR 1910 and 1926, including 29 CFR 1910.120.
- Riverdale Chemical Company. 1997. Remedial Investigation Report, Riverdale Chemical Company. Chicago Heights, Illinois. April 2, 1997.
- RMT, Inc. 1999. Feasibility Study Report. Riverdale Chemical Company. Chicago Heights, Illinois. June 1999.
- USEPA. 1984. Administrative Order of Consent for Immediate Response Measures. September 28, 1984.
- USEPA. 1985. Administrative Order of Consent for Remedial Investigation/Feasibility Study. Riverdale Chemical Company. Chicago Heights, Illinois. February 22, 1985.
- USEPA. 1986. Superfund remedial design and remedial action guidance, OSWER 9355.04A.
- USEPA. 1992. Standard operating safety guides. Publication 9285.1-03, PB92-963414. Washington, D.C.: Office of Emergency and Remedial Response. June 1992.
- USEPA. 1996. ATSDR Record of Activity. Riverdale Chemical. July 29, 1996.

Appendix A

Sign-In Sheet

Acknowledgement Statement:

As an employee of RMT, Inc., I have reviewed the Hazard Assessment and Site Health and Safety Plan. I hereby acknowledge that I have received the required level of training and medical surveillance, that I am knowledgeable about the contents of this site-specific Health and Safety Plan, and that I will use personal protective equipment and follow procedures specified in the Health and Safety Plan.

Signatures of RMT Site Personnel (required):

_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____

Waiver Statement:

In order to enter the exclusion zones and the contamination reduction zones, other site personnel must sign a waiver prior to site entry. Other site personnel must review the RMT HSP prior to entry and should, as a minimum, follow the guidelines specified in the plan. However, visitors are responsible for providing their own health and safety plan and protective equipment and must accept responsibility for their personal health and safety while on-site as indicated on the waiver. Entry authorization to visitors by the HSR does not constitute acceptance on the part of the HSR, RMT, or Riverdale Chemical Company of responsibility for visitor health and safety plan adequacy or visitor safety.

I have reviewed the Hazard Assessment and Site Health and Safety Plan.

Signatures of Site Personnel (required):

_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____

Appendix B

Lyme Disease

Lyme Disease

Lyme disease is an illness that if not diagnosed and treated promptly can cause serious problems involving the heart, joints, eye, and nervous system. Lyme disease was officially recognized in the United States in 1975 in children from Lyme, Connecticut. Lyme disease is transmitted to people and animals by the bite of the deer (bear) tick (usually in the midwest and eastern coastal states) or the western black-legged tick (usually in the western states), but other tick species are suspected carriers. Adult deer ticks are very small (about the size of a pencil point).

Signs and Symptoms of Lyme Disease

Lyme disease typically progresses through three stages.

Stage 1

In the earliest stage, people with Lyme disease may have any combination of the following signs and symptoms:

- Headache
- Chills
- Nausea
- Fever
- Spreading rash (ECM)
- Aching joints
- Fatigue

Without treatment, these signs and symptoms may disappear altogether, or they may recur intermittently for several months. The red rash, called erythema migrans or erythema chronicum migrans (ECM), usually appears within 3 to 32 days after a person is bitten by an infected tick. The rash is circular in shape and can attain a diameter of 2 to 20 inches. The center of the rash becomes clear, giving the characteristic appearance of a "bull's-eye". More than one lesion can occur on the body. Up to 30% of people who have Lyme disease do not develop ECM lesions, making diagnosis more difficult. If Lyme disease is diagnosed during Stage 1, it is usually easily treated with antibiotics.

Stage 2

Weeks to months after the initial bite, some people may develop complications involving the heart and/or nervous system such as varying degrees of heart blockage, meningitis, encephalitis, and facial paralysis (Bell's palsy). Painful joints, tendons, or muscles may also be noted during this stage of the disease.

Stage 3

Arthritis is the most commonly recognized long-term sign of Lyme disease. Research has shown that even if Lyme disease was not diagnosed and treated promptly, people who eventually received appropriate antibiotic therapy had fewer relapses than those who were never treated.

Removing Ticks

The best way to remove a tick is to grasp it with tweezers as close to the skin as possible and gently, but firmly, pull it straight out. Do not twist or jerk to avoid leaving the head of the tick imbedded in the skin (which may then have to be surgically removed). Wash the bite area and your hands with soap and water and apply an antiseptic to the bite site.

Lyme Disease

Lyme Disease in Domestic Animals

Lyme disease has been diagnosed in over 40 breeds of dogs. Signs in dogs may include various combinations of the following:

- fever of 103-106°F
- severe pain
- sudden onset of lameness
- poor appetite
- intermittent lameness for weeks or months
- signs of illness observed within a few days or up to several months after initial exposure

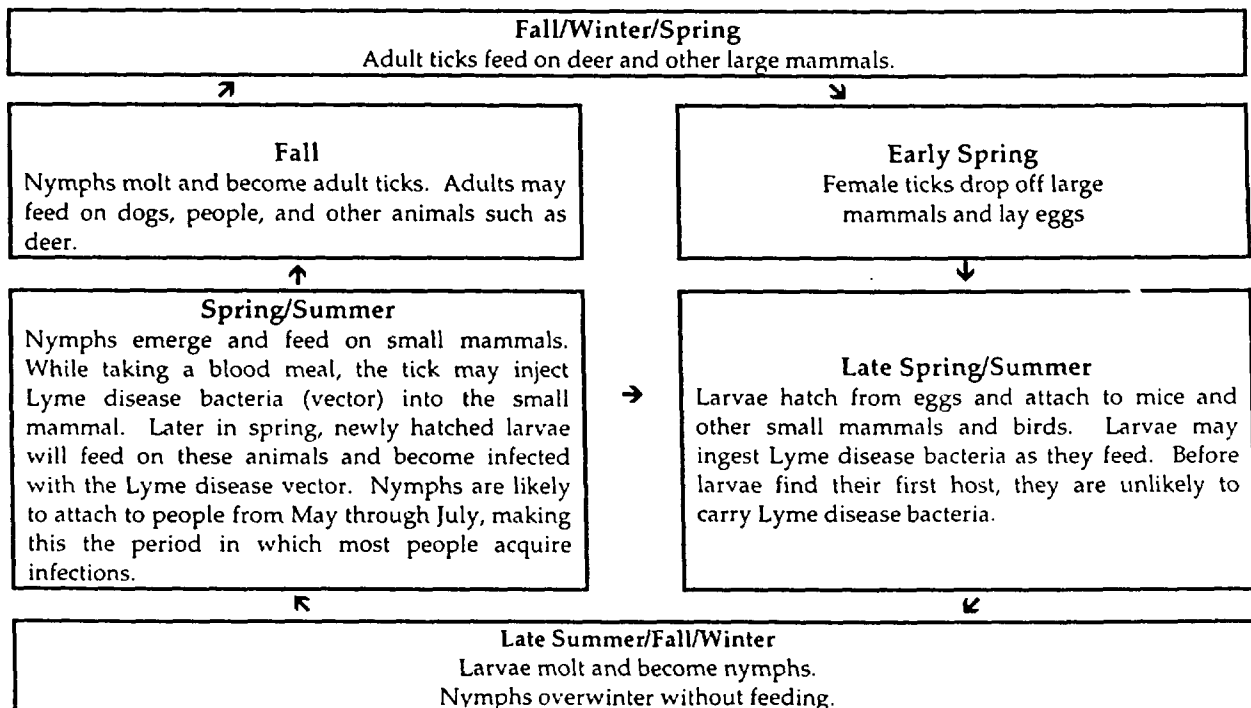
Cattle and horses can also contract Lyme disease. They may exhibit a variety of signs, including fever and lameness.

Prevention

By routinely checking for ticks (adults as well as other life stages) after being outdoors, you can remove them before they embed and have the chance to transmit Lyme disease.

1. Conduct thorough tick checks on yourself, children, and pets after spending time outdoors.
2. Wear light colored clothing. This may not deter ticks, but it makes them easier to find.
3. Ticks wait atop of grasses and other vegetation until something brushes against them.
4. Apply tick/insect repellent to pants, socks, and shoes as well as skin (30% DEET and permethrin are recommended).
5. Always walk in the center of mowed trails to avoid brushing up against vegetation.

Tick Life Cycle



Paraphrased from "Lyme Disease in Wisconsin: An Update" published by Wisconsin DNR and Dept. of Health and Social Services.

Appendix C

Poison Plants

Poison Plants

Poison ivy, poison oak, and poison sumac are the three most common urushiol (poisonous, irritant liquid)-containing plants in this country. Each year they cause almost 2 million cases of a dermatitis that can be extremely distressing. Urushiol poisoning is the greatest single cause of Worker's Compensation claims in the United States.

The common poison ivy (*Toxicodendron radicans*), in six subspecies, thrives from southern Maine to Florida and as far west as Nebraska, Kansas, Oklahoma and Texas. It can also be found near the Mexican border in eastern Arizona and western New Mexico. Humid weather and rich, damp soil favor its spread, but it can persist in what might seem rather daunting circumstances.

Rydberg's poison ivy (*Toxicodendron rydbergii*) is the most northerly ranging species of poison ivy and can generally be found in moist habitats in the northern and mountain states.

Poison oak is a woody plant that grows in dry barren areas from southern New Jersey to northern Florida and as far west as Oklahoma.

Poison sumac is usually found along the margins of swamps and bogs where the soil is acid and wet. The shrub can grow to 20 or more feet high and is never found in the vine-like form of its ivy relatives. Poison sumac shrubs in dry soil are stunted but are just as poisonous as the larger version. They look harmless and poison the unwary.

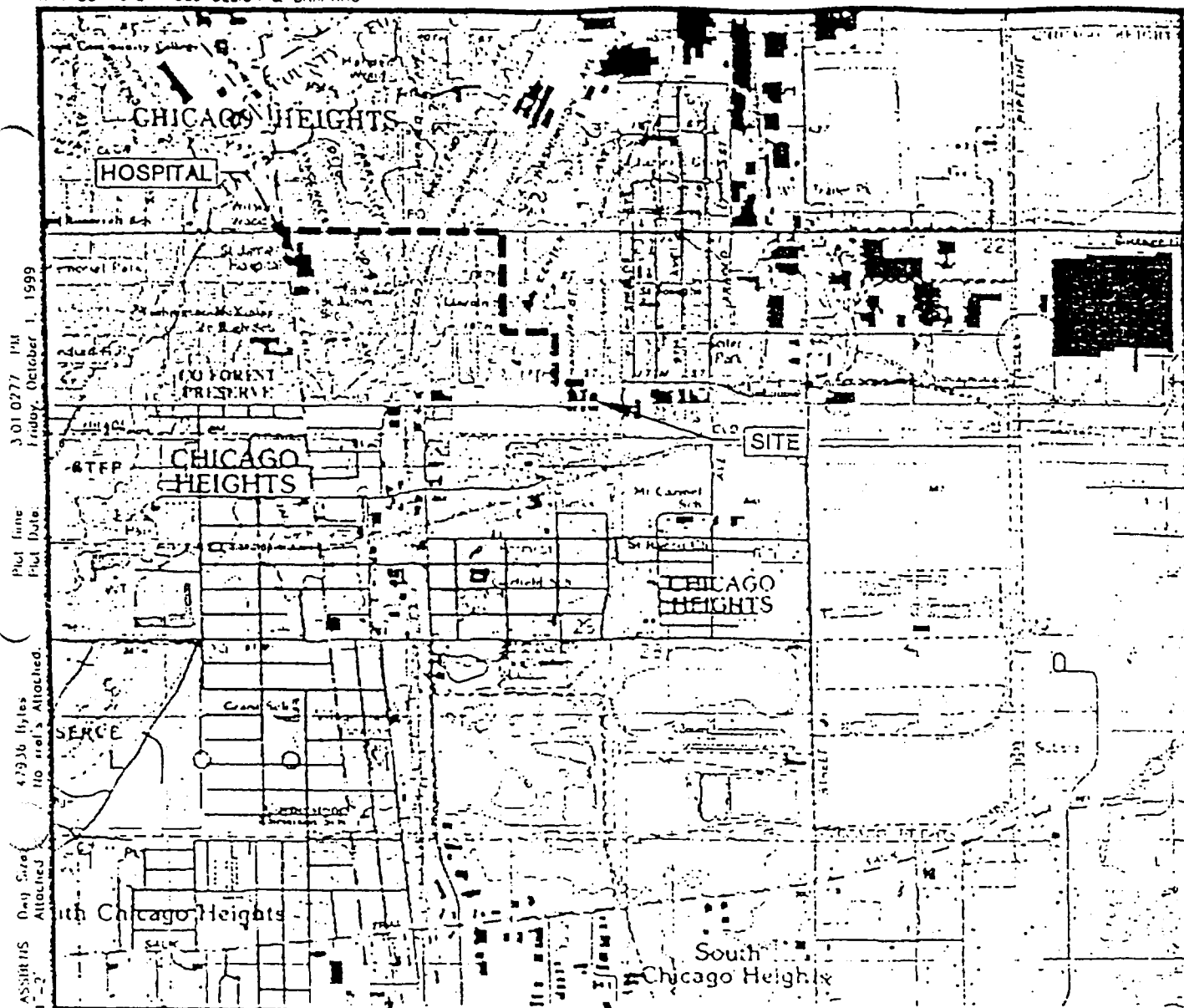
The key to protection from urushiol is the ability to recognize and avoid the plants that carry the poison. The folk wisdom "Leaflets three, let it be" is a good rule for the inexperienced, but alert those assigned to work near any vegetation. All the plants mentioned except poison sumac have three-leaflet stems. The two side or lateral leaflets appear to be symmetrical and they grow close to the stem while the end leaflet is distinct and alone. Poison sumac can have 7, 9, 11, or 13 leaflets; these also grow in symmetrical pairs close to the stem, except for the one at the end. The odd numbers between 7 and 13, the symmetrical pairing, and the isolated end leaflet should allow the worker to be able to group poison sumac with its evil relatives and avoid them all.

In the rare instance where contact with urushiol-bearing plants cannot be avoided, the worker must take extreme precautions to prevent direct or indirect contamination. Ordinary work trousers tied at the boot mouth, a long sleeved shirt and long gloves will usually protect against direct contamination of the skin, but protection against indirect contamination requires great vigilance. A casual wipe of a contaminated glove against the head can cause the characteristic rash and a breath of smoke from burning urushiol-containing trash can inflame the mouth, nose, throat, and lungs. Clothing and tools can remain contaminated for years after being in contact with a urushiol-producing plant. Washing contaminated clothing and contaminated surfaces with large amounts of cold water is the easiest way to get rid of urushiol.

(Taken from: Mine Safety and Health Administration - Health Hazard Information)

Appendix D

Hospital Emergency Route Map



DIRECTIONS FROM SITE TO HOSPITAL

EXIT SITE ENTRANCE AND TURN WEST (LEFT) ON EAST 17th STREET TOWARDS BUTLER STREET. TURN RIGHT ON BUTLER STREET AND DRIVE ABOUT .1 MILES NORTH TO EAST 16th STREET. PROCEED NORTH TO EAST 14th STREET AND CONTINUE WEST FOR .5 MILES TO CHICAGO ROAD AND TURN LEFT. THE HOSPITAL ADDRESS IS 1423 CHICAGO ROAD.

HOSPITAL ADDRESS

ST. JAMES HOSPITAL
1423 CHICAGO ROAD
CHICAGO HEIGHTS, ILLINOIS, 60411
TELEPHONE: (708)756-1000

(NOT TO SCALE)

HOSPITAL EMERGENCY ROUTE MAP RIVERDALE CHEMICAL COMPANY CHICAGO HEIGHTS, ILLINOIS

RMT

OWN. BY: FASSBENS

APPROVED BY:

DATE: OCTOBER 1999

PROJ. # 4962.01

FILE # 49620115.DWG

APPENDIX D

3:01:0277 PM
Friday, October 1, 1999

Plot Name
Plot Date

47936 bytes
No error's Attached.

Day Size
Attached

1-2
PASSBENS

Operator
Scale:

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PLOT 21
Drawing

Appendix E

Incident Forms
